MARITIME STRATEGIC EVALUATION FOR ISRAEL 2021/22

Chief Editor: **Prof. Shaul Chorev**

Editor: **Dr. Ziv Rubinovitz**

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جامعة حيفا

HMS

Maritime Policy & Strategy Research Cente
המרכז לחקר מדיניות ואסטרטגיה ימית

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April 2022

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The Maritime Strategy Evaluation report, including the insights and recommendations, are based on the personal experience and professional judgment of the authors, but do not necessarily represent the official position of the Center or of the University of Haifa.

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Photos (left to right): The Ever Given container ship blocking the Suez Canal; Exercise of Chinese and Russian battle ships crossing a mined area (Xinhua); Haifa Port (Haifa Port Spokesperson); Oil tanker on fire in the Gulf of Oman (Reuters).

Maritime Policy & Strategy Research Center

The center is developing knowledge in maritime strategy, focusing on Israel's maritime surroundings: the Eastern Mediterranean and the Red Sea. The center does so in five core areas: (1) regional security and foreign policy, (2) the mobility of goods, people and ideas, (3) law, (4) energy (5) and the environment. In 2017, the Wydra Research Center for Shipping and Ports was added as a division to the Maritime Policy and Strategy Research Center (HMS), and in 2020 the Ezri Center for Iran and the Persian Gulf Studies was also attached to HMS.

The center was established in response to the of rising significance of the maritime domain both globally and in our region: the emerging strategic maritime competition between the United State and China, the expansion of exclusive economic zones (EEZ) and the crucial role of the seas in the international economic system both as a source of economic activity as well as serving as the world's main trade route. Our immediate environment saw a similar rise in the significance of the seas including the oil discoveries in the eastern Mediterranean, the evolution of the Israeli navy into a national strategic arm, Israel's total dependence on sea trade, and the growing realization that future development of national infrastructure may have to be done in the sea as land is becoming scarce.

Content

Executive Summary

Editor's note: The book was originally published in Hebrew in January 2022. Dramatic events that occurred since then, like the outbreak of the Russia-Ukraine war in late February 2022, which already has considerable impact on the international system and on the maritime domain, are not discussed in this book. The articles reflect the situation at the end of 2021.

In 2021, the international system continued experiencing change, which has significant implications for the maritime arena. The passing year was marked with a global effort to overcome the COVID-19 pandemic and the economic recession that it caused around the world, and return to normalcy, as much as the vaccines allow and as long as new variants do not force lock-downs. The year started with the transition of power in Washington, DC, which changed the US foreign and defense policies from the previous administration. This had substantial effect on the international system.

2021 was an eventful year in the maritime domain, in our region and around the world. This emphasizes the need for a systemic, orderly, and interdisciplinary thinking in maritime context. The rich collection of articles in this book presents a variety of topics – strategic in the global level, strategic in the regional level of the Middle East, economic, ecological, legal, and administrative. There are articles that deal with Israel while others examine other countries with little connection to Israel.

This year's Maritime Strategic Evaluation for Israel includes 22 articles, as well as this summary and the conclusion and recommendations. Following are the key points from the articles and recommendations.

Section 1: The Maritime Domain – Strategic Aspects

Global developments: Shaul Chorev surveys the key developments in the global maritime domain in 2021, the second year of coping with COVID-19 alongside a relative recovery of global trade.

In the international arena, the shift in the balance of power continues, from the US-led unipolarity that characterized the 1990s and early 2000s to bipolarity with China or multipolarity with China and Russia. China continues to gain power, forming into a superpower. It holds and keeps territory it views as its own, particularly in the South China Sea, and is building an army and navy that could challenge the international order and stability and undermine common norms. Thinking into the future, how would China use its military, when in present day it is already acting aggressively in the South China Sea and vis-à-vis Taiwan? However, China is not the

only country to challenge the United States. Russia is also active, particularly in post-Soviet countries. Recently, the tensions with Ukraine increased, and the United States threatened Russia not to use force against Ukraine. As soon as March 2021, the new administration in Washington hastily issued an interim national security strategy document, while it is working on a formal document that would be issued, as became traditional, later during President Joe Biden's term. The interim document identifies China as the main adversary of the United States, but also aims to recover the United States itself, socially and economically.

Repairing the United States' relations with its traditional allies is a critical task for the Biden administration, particularly with Europe after President Donald Trump's term that undermined the transatlantic relations. Russia's recent aggressive actions position it as Europe's main adversary. This makes the repairing of the US-Europe relations much more likely and much faster than previously assumed. Russia is not only active in Europe but also in the Middle East, specifically being involved in Syria and Libya. This increases its influence and undermines the US influence.

Cooperation between the United States, Australia, Japan, and India has grown because of their joint concern with China. The United States, the United Kingdom, and Australia have formed a tripartite alliance (AUKUS) which will provide Australia technologies to build nuclear submarines of US and UK production instead of France.

The hasty withdrawal of the United States from Afghanistan and the Taliban's taking over of the country even before the last US troops left sheds negative light on US power; therefore, it is losing much of its status as a credible ally. The credibility of the US commitment to Taiwan will likely be tested in the near future given China's threats and recent actions near Taiwan.

The UN Climate Report (IPCC) that was published in August 2021 is important because it no longer allows us to deny the seriousness of the climate situation. Following its publication, it is clearer what needs to be done to prevent the crisis, and how to prepare to cope with its consequences, but we are struggling to understand how to do this at the correct pace.

In the cyber domain, the main concern in the west is of a widespread attack on a country's infrastructure, mostly by Russia, China, Iran, and North Korea. The concern with cyber attacks, whose cost could be extremely high (about $600 billion per-year, roughly 0.8% of the global GDP) will require allocating more resources for defense against such attacks. The cyber threat to the shipping and ports sector is greater, particularly in the COVID-19 era, because ships are required to be connected to

the internet for communication for longer periods of time, exposing them to cyber attacks more than previously. This is happening while a large part of the electronic equipment on ships is out-of-date and not shielded from attacks.

The waves of refugees around the world, particularly from Africa and the Middle East to Europe, were slowed down significantly in 2021, much due to the restrictions on travel related to COVID-19. Yet, refugees use maritime paths to reach safe havens, and many perish on the way.

Regional developments: Dissatisfaction and social-economic complaints in the Middle East will continue feeding unrest, violence, and instability, especially given the dire economic situation due to the COVID-19 pandemic. Some Middle Eastern countries are expected to become failed states which might bring about their economic collapse. Iran is expected to continue projecting power through its military forces, and its willingness to strike against US interests would heavily depend on its assessment whether such strikes would endanger the easing of sanctions, would the United States retaliate, and would it ignite a direct confrontation, of which Iran seems flinched. The new government in Tehran, led by President Ebrahim Raisi, is likely to continue implementing the strategy of brinkmanship in the negotiations on a new nuclear deal. Iran will continue intervening in Lebanon, strengthening Hizballah, and would attempt to foil Lebanon's appeal for Western aid by civilian means like the supply of fuel. Iran will also continue aiding the Houthis who are targeting US and Saudi interests, and would continue threatening Israel, directly and indirectly.

The United States' strategy in the Eastern Mediterranean remains ambiguous. There is yet a coherent strategy toward Turkey, Libya, or Syria. In contrast, Russia aspired to increase the dependence on its gas, to nurture favorable political elites, and to prevent NATO and the European Union from expanding eastward.

At the end of 2020, Turkey had somewhat moderated its years-long dispute with Greece and Cyprus, probably hoping to diminish the support for the latter by the EU, Israel, and Egypt. President Recep Tayyip Erdogan changed his tone toward Israel, and Ankara stated that through Turkey, Israel's natural gas would be traded effectively in other markets. Erdogan's phone conversation with Israel's President Isaac Herzog upon his inauguration in July 2021 matches this trend. The presidents agreed that there is a basis for cooperation, particularly on energy, tourism, and technology. The softening of Turkey's positions toward the west doesn't necessarily indicate any softening toward Greece or Cyprus. It appears that Erdogan is keeping all options open and is assessing from where he could obtain better strategic and political achievements.

The Red Sea region turned into one political and security-wise region, in which the great powers and the regional countries have significant interests, particularly relating to free trade and navigation between Bab el-Mandeb and the Suez Canal. The blockade of the Canal in March 2021 for six days demonstrated the importance of the Red Sea for international trade. There is also a superpower competition for influence in the Red Sea that makes it ever more important to all nations that reside on its shores, including Israel.

Terrorist activities diminished during 2021 thanks to the COVID-19 related restrictions on movement. In our region, the naval branch of the Revolutionary Guard conducted terrorist attacks against ships owned by Israelis or otherwise associated with Israel, although they neither raise an Israeli flag nor are registered in Israel.

Chorev's article also surveys developments during 2021 in **the most important navies in the world** and in the Middle East.

The US Navy is still the most powerful in the world, however it faces growing challenges, particularly from China. The US Department of the Navy's budget for 2022 is $211.7 billion, an increase of 1.8% from 2021, however the procurement budget was cut by $2.7 billion. The Department defines the measure of the Navy's strength as "our ability to control the seas and to project power." The budget allows the deployment of 296 ships, including 11 aircraft carriers and 31 amphibious vessels. In 2022, the Navy will receive 17 new ships and will decommission 14. In fact, the Navy is investing in maintenance of ship and aircraft on the expense of procurement and force building. Since President Barack Obama announced the Pivot to East Asia, the Navy's activity in the Mediterranean was significantly reduced. In August 2021, only one vessel of the Sixth Fleet was active. The Biden administration had not yet formulated a strategy for the Mediterranean Sea. Under Biden, the US-Turkey relations might be shaken, but the United States and Turkey have many shared interests, such as the Russian and Chinese challenges that justify increasing cooperation.

China: China's maritime interests are growing; thus, its navy is growing as well as its exercises. A report submitted to the US Congress argues that quantitatively, the Chinese navy is larger than the US Navy, but qualitatively, it is inferior to it. However, the Chinese navy is improving constantly and is closing the gaps quickly. According to the report, China plans to implement the Anti Access, Area Denial (A2/AD) strategy to deter the United States from intervening in case that hostilities break out in the South China Sea.

Nevertheless, despite its strengthening, it seems that the Chinese navy is limited in several aspects: anti-submarine warfare, long-range attacks, the capability to train a large number of crewmen for the new ships, command cohesion, and lack of combat experience. However, China developed land-based ballistic missiles capable of hitting vessels. It also has submarines, most of which are non-nuclear driven, and two aircraft carriers, but for a possible attack on Taiwan, the latter would not be needed, as China could strike from its land bases.

China's investment and involvement in the Middle East is growing. It has a naval base in Djibouti, is strengthening its ties with Iran, and trades with regional powers. Experts in the United States believe that the Middle East will become competitive between the superpowers. China is the largest consumer of oil from the region, and as the use of oil around the world decreases, China's importance for oil exporters in the region will only grow.

In September 2021, after 15 years of planning and construction and an investment of $5.5 billion in infrastructure and operating equipment, the "bayport" (Namal HaMifratz) was inaugurated in the Haifa Bay, run by the Chinese company SIPG. The US government expressed its concern over the construction of essential infrastructure in Israel by Chinese companies. In May 2020, then Secretary of State Mike Pompeo visited in Israel and warned then Prime Minister Benjamin Netanyahu against the win by the Chinese Hutchison Company of a tender for the construction of the Sorek 2 desalination plant. The concession was eventually awarded to a consortium of the IDE desalination company and Bank Leumi.

Russia: Despite its dire economic situation, Russia intends to keep its navy's status as one of the most powerful in the world. The Russian navy increased its activity in the Arctic area, expanded its presence in Africa and the Middle East, and continued challenging NATO in Europe. Russia continues to replace large ships with smaller ships like corvettes and frigates. Its new cruise missiles compensate for the Russian ships' inferior size and armament compared to NATO's navies. The new Russian missiles can hit targets across Europe and the Middle East.

Russia is prioritizing the navy in recent years following the deteriorating relations with the west following the annexation of Crimea in 2014. It aspires to be present everywhere the Soviet navy was present during the Cold War. In the Mediterranean, Russia's navy is deployed permanently and uses the Port of Tartus in Syria.

The Russian strategy in the Mediterranean Sea is part of its strategy in the European theatre, which Russia considers to be the most important. Russia considers the West

as the largest threat to its domestic political order. The Russian naval presence in the Mediterranean is intended to protect Russia's achievements in Syria as well as Russia itself against NATO's naval and air threats. It is possible that in the future, Russia would like to dominate the Mediterranean Sea, but at this time, it suffices with preventing NATO's operations, and to some extent, it replaces the United States and NATO as a mediator and powerful actor in the region. Part of the Russian strategy in the Mediterranean is driven by the need to gain a foothold in countries with new energy related development. In Egypt, Russia purchased 30% of the shares of the Zohar gas field from an Italian company, and in Libya, it is taking a major gamble for the possibility of acquiring concessions. In the Red Sea, the Trump administration pressured Sudan not to sign off on rights of anchorage for Russian warships in Port Sudan. At this time, a Russian proposal to construct a Russian naval base in Port Sudan is postponed.

India: The role of India's navy is to protect India's natural wealth, to keep its trade routes open, and to maintain its international status. This requires having a large and powerful navy, which will always be on alert to defend against a security threat or respond to a natural disaster. The Indian navy is one of the largest in the world. China's navy is its point of reference, which is why India plans to procure vessels like submarines (nuclear and conventionally driven). Yet, the navy's budget has decreased in recent years, with an exceptional increase of 22% in 2021.

Turkey: Turkey is engaged in several conflicts in the maritime domain. In summer 2020, the Turkish and French navies confronted one another in the Eastern Mediterranean. The dispute with Greece on the demarcation of their maritime border could turn into hostilities, similar to the dispute over Cyprus's EEZ. It appears that all these conflicts originate in Turkey's Blue Homeland idea. Its basis is a Turkish demand to increase its territorial waters significantly. The navy is prioritized by the government and it seems to be on the path to become a great power navy, similar to the United Kingdom and France.

Egypt: Egypt wants to be the most powerful naval power in the Eastern Mediterranean and Red Sea. In the Global Firepower Index for 2021, the Egyptian navy was ranked seventh in the world, however, it seems that this disregards several elements like the quality of the combat systems. In any case, Egypt is investing considerably in its navy in recent years based on its understanding of the navy's importance given the future challenges.

Egypt is procuring ships of different types but also constructs its own. The Egyptian navy is divided between the northern fleet that deals with the Mediterranean and

the southern fleet that deals with the Red Sea and the Suez Canal. The northern fleet protects the gas fields and Egypt's economic interests and also controls the flow of refugees to Europe in its area of responsibility. The southern fleet deters threats that emerge from the Yemen civil war and the Horn of Africa, and particularly operates against blockades on maritime routes.

Iran: Iran's strategy in the Persian Gulf and the Gulf of Oman is Anti Access, Area Denial by its rivals to areas that Iran views as vital to its sovereignty and defense. It operates directly and indirectly through its proxies like the Houthis. Iran has two naval forces, one belongs to the military and the other to the Revolutionary Guard. Their assignments are different, as are their training and combat tactics. The Revolutionary Guard has smaller and faster vessels, which makes it similar to a naval guerilla force. The military's navy aspires to operate in the oceans, and two of its ships navigated around Africa into the Atlantic in 2021, eventually reaching St. Petersburg for Russia's Navy Day.

Iran and Israel are engaged in a "shadow war" which became quite public in 2021 with mutual strikes. In April 2021, the Saviz, an Iranian ship anchored across Yemen's coast was hit, allegedly by an Israeli force. It is considered a base of the Revolutionary Guard. In July 2021, the Mercer Street, which is operated by an Israeli company, was hit in the Gulf of Oman.

Benni Ben Ari's article, "Strategies in the Indo-Pacific", surveys the strategic setting of the Indo-Pacific, which has become in recent years the most important maritime route in the world from the economic and military perspectives. Given the conflict of interests of the great powers in this region and the powers of the major countries in this region, there is great concern over a possible outbreak of hostilities. The United States, India, Japan, and Australia, as well as many other countries, view China's growing power in the region as the major threat to their interests, which leads them to cooperate at various levels against China's rise. They are trying to enforce rules of behavior that will secure the existing world order out of concern that China might undermine it.

"Russia and the Indian Ocean": Tzevy Mirkin argues that the Indian Ocean always ranked low on Russia's agenda. During the Soviet era, the Indian Ocean was certainly insignificant until the 1960s, but since the 1990s, after the Soviet Union disintegrated, the Russian navy ceased operations in the Indian Ocean. Under President Vladimir Putin Russia resumes operations in this theatre, including in the international effort against piracy. In the recent decade, Russia's activity in the Indian Ocean grew, however in official documents it does not receive much attention. It appears that

Russia is mostly showing its flag. The Russian navy's activity can also be interpreted as an attempt to show itself as an independent branch after many years that it was considered a secondary player among Russia's military branches.

"The US 'Pivot' to East Asia: Potential Implications for the East Mediterranean If It Were Implemented": Ziv Rubinovitz discusses the US Pivot to East Asia that was announces a decade ago to deal with China's rise. The Pivot was not fully implemented and it is doubtful that it could be implemented in full because the vacuum would be filled by Russia, China, and Iran – all rivals of the United States, with Iran also being a rival of the US allies in the region. This is why Washington's allies in the Middle East do not want it to withdraw but have to think of their future alliances due to the possibility that the United States would redeploy its forces around China after all. A massive rearmament of its allies could at least partly resolve Washington's dilemma, which could become harder in the near future. The rapprochement between some of these allies in recent years is part of their preparation for the uncertain strategic future.

Section 2: The Maritime Domain – the regions close to Israel

"The Development of the Iranian Naval Branch": Shlomo Guetta and Motti Elharar analyze the strengthening of both navies of Iran – the Islamic Republic of Iran Navy and the naval force of the Revolutionary Guard, which have different roles. They started cooperating in recent years. The strengthening of the navies reflects Iran's rising to a regional power. Iran demonstrates its presence in the Persian Gulf, the Arab Sea, and the Eastern Mediterranean, and even conducted its first voyage through the Atlantic Ocean. The Iranian naval branch allows it to act against Israel and to obtain additional interests of Iran in the maritime domain, including bypassing the sanctions regime. The authors argue that the considerable rise in armament and naval activities is related to Iran's sense of threat, especially after the United States withdrew from the JCPOA in 2018. They assess that the naval arena is at the center of Iran's strategy, therefore it is reasonable that it will continue strengthening its naval forces.

Israel-Turkey: In the recent decade, Israel and Turkey were usually at loggerheads, however, recently Turkey is signaling to Israel its interest in resuming their dialog, for instance through the phone call between presidents Erdogan and Herzog after the latter took office as Israel's president. In his article, Omri Eilat focuses on the potential and real points of confrontation between the countries, such as the territorial waters of Cyprus and Turkey's territorial waters vis-à-vis Greece and Cyprus. The article argues that Israel's opening to the sea in the recent decade adds challenges

and dilemmas to the Israeli-Turkish relations, but also new opportunities. Since 2019 Turkey claims sovereignty over a large portion of the Mediterranean Sea, some of which is recognized as Greek or Cypriot according to international conventions. The change in power in the United States altered the patterns of thought in the Middle East. Turkey is attempting to get closer to the Biden administration, including by their attempt to get closer to Israel, the UAE, Egypt, and Saudi Arabia. Israel and Turkey have many shared economic interests in the Mediterranean, which can serve as a basis for improving relations, alongside similar security threats like Iran's basing in Syria and Lebanon.

Changes and transformations in the Red Sea Basin: Moshe Terdiman discusses events in recent years around the Red Sea that impact geostrategic affairs in the sea and on its shores, including the war in Ethiopia, on the one hand, and the various developments in the Arabian Peninsula (the rapprochement between the Gulf states and Saudi Arabia, and the war in Yemen) on the other hand. Israel's interests in the Red Sea are to prevent the blockade of the Bab el-Mandeb Strait and to prevent Iranian oil and arms from reaching the Houthis, Hizballah, and Syria. The regional uncertainty and volatility make it imperative for Israel to follow closely the changes in the region while remaining aloof from the conflicts. Israel must also avoid getting embroiled in the great powers complicated interests in the region.

"Maritime Security in the Gulf of Aden and Red Sea": Stephen Blackwell from the Trends Research and Advisory think tank in Abu Dhabi discusses the cooperation of the GCC members with the countries residing along the Red Sea and the Gulf of Aden against piracy and in strengthening maritime security while the war in Yemen is ongoing. Maritime security in the region is becoming more important because of the need to secure the safety of ships in Bab el-Mandeb on their way to the Suez Canal. One of the examples of regional cooperation the author mentions is the establishment of the Red Sea Forum, which can mediate in conflicts and deal with long-term threats. However, there are disagreements among member states, for instance when Egypt demands that only countries that reside on the Red Sea would participate, a measure that would secure Egypt's senior status in the Forum. There is a potential for fruitful cooperation in the region for everyone's benefit and for the termination of the wars in the region.

"Military Innovation on the Part of the Political Echelon – the Dolphin Submarines": In this article, Itsik Bilia argues that in the relations between the political and military echelons, the political one initiates military innovation, both technological and strategic, while the military is many times fixed on obsolete concepts. The article focuses on describing the events that brought Germany to promise Israel to

supply two Dolphin submarines during the 1991 Gulf War. Defense Minister Moshe Arens pushed for obtaining German submarines despite the military's preference for other procurements. A similar process happened with the Iron Dome system, when Defense Minister Amir Peretz forced his decision to develop this project on the military which objected.

Section 3: The Maritime Domain – Economic Aspects

"The Incident of the Suez Canal blockage by the *Ever Given* Container Ship": Ehud Gonen discusses the incident in March 2021 when the *Ever Given* blocked the Suez Canal and its cost for shipping and maritime trade. The incident was a reminder of the importance of the Suez Canal for global trade and how vulnerable the transit through it actually is. A blockade of the Suez Canal had dire economic consequences for Egypt, for which the Canal is a significant source of income (roughly 10% of the government's revenue). The Canal is important also to Egypt's neighbors, including Israel, for which the Suez Canal is a critical waterway and its blockage can result in long delays of their trade. The article examines alternatives to the Suez Canal and how worthwhile they might be; however, most of them are inapplicable due to economic and political reasons.

"Exclusive Economic Zones (EEZ) in the Red Sea Region": Shlomo Guetta analyzes the Exclusive Economic Zones of the countries residing along the Red Sea. He argues that the production of energy from the Red Sea would change the definition of the Red Sea basin and its importance would grow. However, while the Red Sea could bring economic prosperity to these countries – particularly Egypt and Saudi Arabia – it could also cause conflicts. Freedom of navigation in the Red Sea is imperiled by the civil war in Yemen and Iran's activity to aid the Houthis. While Israel is not a major player in the Red Sea, its interest in maintaining freedom of navigation is obvious. Israel should aspire to have its status in the Red Sea recognized, and the Red Sea Forum alongside the Abraham Accords could do just that.

"Solar Hopes and Grounded Reality": Elai Rettig's article asks if Israel can meet its own commitments to transition to clean energy and whether it is advisable. In the coming decade, the Israeli market will become more dependent on natural gas due to geographical and technological difficulties to meet the goal of producing 30% of Israel's energy from renewable sources. Israel should invest in reducing air pollution as a result of the use of coal power plants and the large number of vehicles. It should also prepare for weather-related damage that originates in climate change. The article warns against setting unrealistic targets about renewable energy that would be the basis for increasing the export of natural gas. If the goals are not met,

Israel might find itself without enough gas for its own needs, which would result in dependence on expensive imports.

"The Chevron Corporation and the State of Israel": In late 2020, the Chevron Corporation bought Nobel Energy and thus entered the Israeli market. Glen Segell discusses the difficulties Chevron and Israel went through in 2021 and their need to cooperate for mutual economic benefits. The article also discusses Chevron's place in the discussions on the EastMed pipeline that is planned to be laid in the Mediterranean to connect Israel's gas fields to Europe through Greece, and points out that it is important to discuss this with Turkey which views the pipeline as an economic threat. Chevron can lay the pipeline for future profits. By finding the gas fields, Israel benefited the strengthening of its Navy with new ships which provide it with new capabilities to project power.

Section 4: Dangers in the Maritime Domain

"Hazards of Transport of dangerous goods in Ships": Alex Gerson analyzes the hazards in transporting dangerous goods in ships. The desire of ship owners and operators to increase the number of containers with dangerous goods is obvious, but it is important to remember that dangerous goods require special skills and training to deal with problems, if they occur, before and during the voyage. The increase in the amount of dangerous good on cargo ships raises the stakes for a disaster at sea or near population centers. International conventions and transport rules of the International Maritime Organization define how to treat such substances but the rules need to be enforced. Because of its location and the volume of maritime transport in its vicinity, Israel must prepare for disasters caused by dangerous goods at sea and for regional and local maritime pollution in partnership with its neighbors.

"Black Carbon Emissions from Ships in Israeli Ports": Merav Gonen discusses environmental dangers of air pollution originated in ships, particularly black carbon emission into the air – particularly at ports and in port cities that are exposed to severe air pollution. Black carbon is second only to carbon dioxide in its impact on global warming, and cruise ships and cargo ships emit it in levels disproportional to their portion of the shipping industry. Polluting emission is most severe during a ship's time at the port. The article suggests several solutions to reduce carbon emission from ships, such as replacing their fuel and improving its usage, or connected ships to electricity at the port instead of forcing them to operate their engines while Hoteling.

Section 5: Maritime law, good order at sea

"The State of Israel and the Convention on the Law of the Sea – the Current State": Benny Spanier discusses Israel's status in maritime law due to the fact that it never joined UNCLOS (1982), and examines the reasons for its refusal to sign it in 1982 compared to the situation today. In 1982, five reasons were given: The PLO's status in UNCLOS and the concern that Israel would appear to recognize the PLO by signing the Convention, the narrowing of navigation rights through the Tiran Strait (compared with the Israel-Egypt peace treaty that defined passage through Tiran as freedom of navigation), the limits on the ability to board ships for search on high seas, the requirement of arbitration in case of disputes, and the fact that the United States also did not sign. Although Israel did not sign it, it accepts UNCLOS as customary law, thus it enjoys all of its rights. This raises the question should Israel sign after all. Apparently, nowadays the arbitration issue is the main cause for Israel to not sign, but there is a debate between the concern that Israel could be dragged into arbitration and the possibility that by signing, Israel will have a normative leverage over its neighbors in attempting to settle their maritime disputes.

"UNCLOS, Delimitation of Maritime Boundaries and Offshore Infrastructure as a Means for Regional Cooperation and Reconstruction of the Gaza Strip": Orin Shefler deals with possibilities to settle the maritime border between Israel and the Gaza Strip as part of the settlement of the Israeli-Palestinian conflict. The classic security concepts place the Palestinians at an inferior position, but the sea is an arena where they have a good chance to obtain significant political and economic gains. Cooperation at sea can serve all parties' interests. The article distinguishes between two approaches to settlement of control at sea: the classical approach examines governance and military, security and political control, while the modern approach also touches on economic issues and division of natural resources according to UNCLOS. The Maritime Areas Law that is being discussed by the Knesset in recent years combines the two approaches. Israel wants recognized maritime borders and thinks more about managing its rights at sea than about military control over the sea, which the author argues had been accomplished.

"A Model for an Israeli Academic Maritime Monitoring System": Semion Polinov and Shaul Chorev discuss sensors for tracking objects at sea for inspection, security, and preventing of pollution. The article calls for an open-access database. The size of Israel's EEZ is larger than Israel's pre-1967 size. The EEZ includes energy resources, Israel produces most of its drinking water from desalination, and there are also natural resources. Nearly all of Israel's trade is done by sea, and the sea can also be

used for future urban development. The article presents the various capabilities of the existing satellites to fulfill the needs of the monitoring system.

"Estimate of the Cost of Protecting the Sea Ports in Israel Against Cyber Threats": The maritime chain of supply is vulnerable to cyber attacks whose economic damage could be very high. Itai Sela discusses the question of securing the computer systems of Israel's ports. The systems are old and include neither security updates nor cyber security. Moreover, there are no mandatory recommendations in this field and the system depends on the human factor to respond to cyber attacks. The cost of a cyber attack on an Israeli port is estimated around $1.7 billion, while the annual cost of cyber defense is around $3.5 million. Investing in cyber defense is worthwhile from an economic perspective. It is important to shift cyber defense from the human factor to computer systems.

"Government Subsidies for the Maritime Sector Around the World": Ofir Kafri examines the various subsidies that countries provide for their maritime sector. These subsidies refer to infrastructure, research and development, air pollution, manpower, energy, and shipping, and they allow the maritime sector to be globally competitive, prevent pollution, and maintain a fleet for emergencies. The subsidies come in different forms, such as tax breaks, easing of payments, and extending credit under favorable terms. Some subsidies fail in fulfilling their purpose and some even cause harm, for instance when they create market distortions. It is important to analyze the planned subsidy and to provide it in a manner that promotes the national interest. A subsidy should deal with a specific issue in a focused manner. A subsidy that provides a universal benefit can fail of cause harm.

"Financial and Other Benefits Through Using Flag of Convenience in the World": Ofir Kafri maps the field of flags of convenience. Some countries are leaders in the fields and provide a variety of benefits to ship registration with them. These include tax reliefs (many times suspected of being tax havens), lenient conditions while registering, and few limitations on issues like the vessel's age, its type, or its tonnage. There are countries that want to have ships register with them again, and the article discusses the methods they use, such as subsidies, lenient registration rules, a second registration, regulatory changes, improved services, and so on. Such actions require investments that sometimes are not worth their cost. Thus, a country like Israel should consider whether to act at all. Goals should be set with appropriate measures. The action should match the characteristics of the vessels the country wishes to register, and registration should be avoided if registering the vessel would be unhelpful, for instance if the vessel is old or polluting.

"Reform in the Ports of Israel – Vision and Reality": Arieh Gavish examines how successful was the reform in the ports, which started more than 15 years ago with the replacement of the Ports Authority with the Israel Ports Company. The article surveys the regulatory and functionality status of the Israeli ports, including the two new terminals – the "Bayport" (in Haifa) and the "South Port" (in Ashdod) – and argues that the reform was unsuccessful because it did not resolve many of the problems at the ports. The malfunction of the ports in the past, including occasional strikes, a long waiting time outside the ports for treatment, and slow treatment of cargo, was improved only marginally, if at all. Some elements of the reform would take many more years to evaluate properly. The Israel Ports Company created a market failure and has conflicting interests. The reform was needed because of serious problems in the ports' functioning and labor relations, but it appears to be insufficient. Therefore, Gavish recommends to replace the Israel Ports Company with a new body.

In the Conclusion, Shaul Chorev offers several insights that are summarized below:

The geopolitical and geostrategic map of Israel had changed in recent years and a new circle of interests evolved, focusing on the East Mediterranean and the Red Sea. In the past, every region was considered separately, but nowadays it is common to view them as one unit. In this new region there are many energy resources and military and civilian assets. Regional and global players are competing over the region, which led the regional countries to change strategies.

The strategic implications of operations in the maritime domain, such as those attributed to Israel against Iran, should be examined. It is important to consider the broader implications, for instance on Israeli trade and security of Israeli-owned vessels. Acting independently in a region like the south Red Sea or the Arabian Sea is beyond the capabilities of Israel's Navy, therefore it is important to intensify cooperation with friendly navies, particularly the US Fifth Fleet.

The demarcation of the maritime border between Israel and Lebanon should progress through negotiations mediated by the United States. Lebanon significantly expanded its demand, arguably basing its new position on UNCLOS. If it gets its way, Lebanon will have a foot in the Karish gas field. Israel should continue negotiating while also determining its maritime borders.

Concerning its relations with Turkey, Israel must understand that its status had changed following the transition of power in Washington, and that its freedom of

action is more limited than it was under the Trump administration. This is also true for Turkey. Both countries should expand their cooperation.

Israeli shipping is in a bad shape for many years, but before deciding on a new policy to replace the policy that was in effect at the time Zim was privatized, the government should learn the changes that happened in the field in recent years. The Marine Institute for the training of naval officers should maintain the professional knowledge on deck and machine majors, and adapt it to new ships.

The decision to establish in Haifa a national center for innovation in cooperation between the Haifa municipality and the School of Marine Sciences at the University of Haifa is correct, but requires complimentary actions by governmental organs like the Chief Scientist of the ministry of science and the Innovation Authority.

Considering maritime education, the Security and Marine Strategy program should be under the School of Marine Sciences. The Israel Navy should have a clear policy for the training of officers who pursue academic studies so that these officers would attend the Security and Marine Strategy MA program.

Finally, the conclusion includes ten recommendations:

1. Formulating a grand maritime policy and strategy for Israel.
2. Formulating Israel's foreign policy in the Eastern Mediterranean and the Red Sea.
3. Preparation and preparedness for civil emergency events at sea.
4. Preparation for climate change effects on Israel's maritime domain.
5. Development and utilization of energy resources located in the sea and protection of the environment.
6. Promotion and organization of good order at sea.
7. Development of a human infrastructure for coping with the challenges in the maritime domain.
8. Shipping and ports in Israel – the government needs to keep the "golden share" in Zim, publish a policy for the shipping and ports sector, and inspect their defense programs against cyber attacks.
9. Israel as a startup nation in the maritime domain – various governmental bodies should support by action the recommendation to establish a national center for maritime innovation.
10. Moving infrastructure from land to sea.

Section 1: The Maritime Domain – Strategic Aspects

The articles included in this section discuss the global arena. This arena is very dynamic, given the growing competition between China whose power is growing and the United States whose power is relatively declining. In addition, there are Russia that is trying to recover its superpower status at least in the military sense, India that is strengthening, and others. The United States under President Biden is trying to recover its relations with its European allies following the Trump administration, thus it needs to rethink its strategy for this era, including in the maritime domain. Meanwhile, China is becoming more powerful, and in response, India is also growing more powerful. The United States identifies China as its main adversary and concentrates resources to meet this challenge, including its naval power. While quantitatively the United States naval power is smaller than China's naval power, qualitatively it is still superior. China had become more aggressive toward its neighbors, specifically in its territorial demands in the South China Sea. In recent years, the Indo–Pacific region became the most important in the world due to the amount of goods shipped through it, and is becoming globally central also in the military aspect because of the intensifying confrontation between China on the one hand and the United States and most of the countries in the region on the other hand. Not only China challenges the United States but also Russia that is strengthening its navy and sending it into the Indian Ocean mainly to show its flag in the arena that is becoming the main theatre of the US–China confrontation. The US Pivot to East Asia harms the security in the Mediterranean Sea and the Middle East, which is anyway unstable. The United States has not entirely left the region, partly because the countries that could fill the vacuum – Russia, China, and Iran – are hostile to the United States and to some of its regional allies, thus it would undermine the regional security even further.

Global Developments in the Maritime Domain

Shaul Chorev

Introduction

As in previous years, the situation evaluation in this report focuses on the Eastern Mediterranean and Red Sea, however the developments in this arena cannot be detached from recent global developments in general, and in the maritime domain in particular. This is due to the close links between the global-scale events and their impact on the arena close to Israel.

2021 saw several outstanding events which have had their influence on the maritime domain:

- The prolongation of the Coronavirus pandemic, including the emergence of new variants
- Recovery of global trade and, in some areas even its growth due to the crisis in the global airline industry
- The mobilization of combat fleets in the conduct of the maritime activity under the constraints of the Coronavirus pandemic
- The inauguration of the new Biden Administration, its focusing of the security effort toward China and its continued scaling down of its involvement in Middle Eastern affairs (including the withdrawal from Afghanistan)
- China's ascending stature as a military and economic superpower, posing a challenge to the United States
- The election of a new President in Iran (Ibrahim Raisi), who is considered a conservative and the tougher diplomatic struggle against the United States
- The geopolitical changes in the Middle East following the Abraham Accords signed between Israel and the United Arab Emirates, Bahrain, Morocco and Sudan and the efforts to broaden the accords to include Saudi Arabia and Oman
- The escalation of the Turkish-Greek-Cypriot dispute over the demarcation of Exclusive Economic Zones
- "Raising of the curtains" from the covert war between Israel and Iran in the maritime domain and its escalation
- The decline of Lebanon, one decade after the Arab Spring, into its current state as a failed state in the Middle East

- The critical condition of the Earth's climate, as reflected in the climate report issued by the United Nations' Intergovernmental Panel on Climate Change (IPCC), including its maritime aspects

The international system

The world is in the midst of a transition from a unipolar system to a multipolar system or, in fact, a post-hegemonic system – a development which causes experts in political science and international relations to take a closer look at the future of the international order. The current crisis of an international order is deep-rooted and has been developing for over a decade, despite the tendency of some political science experts to attribute it to the Trump administration. Some political science experts believe that the main factor impacting the global order, which prevents it from being managed, is the combination of international terrorism and civil war. Over 90% of all war-related deaths in the last five years have occurred in countries where a terrorist organization was active. Of these, the majority (70%) are concentrated in the Middle East. The high body count is not the only unfortunate consequence. This reality has also influenced the large-scale flow of refugees and has affected the tensions pervasive of the entire region.[1]

Dramatic changes around the world prove that the commonly-accepted terms of left and right in political science are losing ground and are being replaced by a new kind of common ideology. Thus, for example, President Biden turned his back on his predecessors' neo-liberal legacy upon being elected, and placed his support behind state investment in stabilizing and developing the economy, in regulation and taxation of large companies. His presidency has been marked so far by efforts to forge bipartisan alliances spanning these three areas: 1. clean energy, 2. investment in the working class and the pursuit of social justice, and 3. investment in infrastructure. Britain's Prime Minister Boris Johnson, who was elected on a conservative platform, has also drifted to the left in all matters concerning public spending and tax cuts for the underprivileged among the lower working classes. Johnson was able to enlist the support of the "traditional right" thanks to his support for BREXIT and his tight immigration policy. He also got the support of environmental activists by making ambitious, specific commitments which are set to make Britain a world leader in achieving reduction of greenhouse gas emissions to zero by 2050.[2]

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1 Bruce Jones, Susana Malcorra, It is now time to focus on multilateral order, *Brookings*, April 19, 2021.

2 Yuli Tamir, Populism in Retreat. Welcome to the Age of Disengagement, Haaretz Weekend, August 11, 2021 [Hebrew]

China's ascendance as a world power: China continues to pursue its ambitions to become a world power, to safeguard what it considers to be its territory, and also to consolidate its importance in regional matters by building a superpower-class military – a development that could undermine the stability and norms of international relations. China's military commitment includes a multi-year agenda of comprehensive military reform initiatives.[3] Interwoven with the extraordinary scale of its military buildup, is the question what use will be made of this force and in particular in view of the increased Chinese aggressiveness in all matters related to its territorial claims in the South China Sea and Taiwan. A new survey from 2020 found that 57% of global investors predict China is going to replace the United States as the largest superpower by 2030.[4] However despite all the talk about China, the Russian Federation still poses a formidable challenge to the new American administration. Therefore, despite the need to deal with domestic problems and with the rivalry with China, the new American administration will have to deal with the Russian challenge as one of its top priorities. Russia's agenda for 2021 includes several pressing issues including the strategic stability dilemma, the threats to the rules-based international order and unresolved regional conflicts.[5] President Putin even made it clear that Moscow was interested in maintaining a strategic nuclear advantage over the USA, including by activating several versions of strategic and sub-strategic hypersonic systems, intercontinental ballistic missiles of a new production series, laser-based combat systems etc.

In March 2021, the new American administration hastily issued the Interim National Security Strategic Guidance, signed by President Biden. This is the first time an American administration issues interim guidelines. Previous administrations avoided issuing formal guidelines expressing strategic intent and making them public before they have been approved by congress. The administration announced it would publish the final document in 2021 or early 2022.[6] In the foreword to the guidelines document, President Biden notes how important he considers this document, since it "convey[s] my vision for how America will engage with the world". The President also demands that the rest of the administration's agencies "align their actions with

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3 Annual Threat Assessment of the US Intelligence Community, Office of the director of the national intelligence, April 9, 2021, p. 7.

4 Saloway, Scott, "China will replace the US as the world's biggest superpower by 2030: UBS survey". *Yahoo Finance (UBS)*, January 24, 2020.

5 Alex Muraviev, Nina Markovic, Russia-US relations in 2021: Key things to watch out for, *The Interpreter.* January 22, 2021.

6 Congressional Research Service, "The Interim National Security Strategic Guidance", In Focus, March 29, 2021.

this guidance, even as we begin work on a National Security Strategy".[7] The main priorities highlighted in the document were specified as follows:

- Protecting the security of the American people by meeting the challenges from great powers, regional adversaries and transnational threats.
- Expanding economic prosperity and opportunity, by redefining America's economic interests in terms of working families' livelihoods and achieving economic recovery grounded in equitable and inclusive growth.
- "Reinvigorating our democracy, living up to our ideals and values for all Americans, and standing up for our values abroad, including by uniting the world's democracies to combat threats to free societies."[8]

The review of the strategic situation states that: "Today, more than ever, America's fate is inextricably linked to events beyond our shores. We confront a global pandemic, a crushing economic downturn, a crisis of racial justice, and a deepening climate emergency. We face a world of rising nationalism, receding democracy, growing rivalry with China, Russia, and other authoritarian states, and a technological revolution that is reshaping every aspect of our lives. Ours is a time of unprecedented challenges, but also unmatched opportunity".[9] The document notes the need to strengthen American society and states that "Our strength abroad requires us to build back better at home",[10] and that "This agenda will strengthen our enduring advantages, and allow us to prevail in strategic competition with China or any other nation".[11] With this, the Biden administration effectively singles out China as the United States' primary adversary, although he also declares the preference to rebuild America domestically, economically and socially.

President Biden's administration began carrying out damage control measures with its partners in the European Union and NATO as to what the Trump administration had left behind, and according to its estimate, it will take considerable efforts to regain trust and restore the relations with the United States' partners. In a survey held among the European Union countries in April 2021, the following findings emerged, reflecting the positioning of the European Union in the international system: public confidence in the European Union institutions has diminished due to their handling of the COVID-19 pandemic and the way they purchased vaccinations. The responders

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7 INTERIM NATIONAL SECURITY STRATEGIC GUIDANCE, The White House, March 2021.

8 Ibid, p. 9.

9 Ibid, p. 6.

10 Ibid, p. 17.

11 Ibid, p. 19.

believe the European Union and its institutions are still relevant, since the citizenry still believes in the need for greater cooperation – in particular to strengthen the European Union as a global player. They are skeptic as to the rebuilding of America's leadership and they feel there cannot be a return to the Cold War-era West. They recognize the central role the European Union plays in their future, but their sense of common vulnerability will not be sufficient to advance the European project. They believe the European Union will in future have to prove its ability to "demonstrate its capacity to deliver".[12] On the other hand, the Europeans currently regard the world as consisting of strategic partnerships, with no automatic alliances. Indeed, in view of the mounting strategic unease throughout Europe as to Russian conduct and intensions in the Baltic region and in the Black Sea region, the Russian-Ukrainian tensions since 2014 and the allegations of Russian intervention in European affairs through a variety of means – have turned the Russian Federation once more into the main strategic and military threat both to NATO and to the European Union, and these might facilitate building the trust and restoration of the relations with the Biden administration. It is important to note that the agreement between the United States, the United Kingdom and Australia regarding the assistance the former two would be extending to Australia in the construction of eight nuclear-powered submarines in exchange for strengthening Australian assistance to the United States against China and the resulting cancellation of Australia's project with France, has tainted the relations between France and the United States to the extent that the French have recalled their ambassador from Washington.

The Russian Federation will continue employing various tactics intended to undermine the American influence, to develop international norms and partnerships, to sow divisions among the western countries, to weaken the western alliances and to demonstrate Russia's ability to shape global events as a leading player in a multipolar international order. In the Middle East and North Africa, Moscow is exploiting its involvement in Syria and Libya to increase its strength, to undermine American leadership, to present itself as an indispensable mediator and to gain access to military facilities and economic entitlements and opportunities.[13] It is to be expected that the Russian posture and military conduct – including modernization of its military, use of military force and inclusion of information warfare – will all be employed to undermine the United States' interests and those of its allies. Despite the stagnation in its security spending, in fact despite even a slight decline, Russia is

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12 Susi Dennison, Jana Puglierin, Crisis of confidence: How Europeans see their place in the world, European Council on Foreign Relations, Policy Brief, June 9, 2021.

13 Annual Threat Assessment of the US Intelligence Community, 9.

going to emphasize new weaponry, which poses increased threats to the USA and the regional players while at the same time continuing its agreements to supply weapons to various countries, holding joint exercises and implementing lessons learned from its involvement in Syria and Ukraine. Russia will remain a prime cyber threat the more it upgrades and uses the espionage network it employs, and will be using this domain to expand its influence and attack its adversaries' infrastructure. Russia will continue to mark critical infrastructure as targets for attack, including underwater cables and industrial control systems, in the United States and its allies and partners, since damaging such infrastructures improves – and in certain cases can prove – its ability to hit infrastructures during a crisis.[14] In addition, Russia will continue demonstrating its ability to strike satellites operating in space, as demonstrated in an experiment conducted in November 2021, in which the Russian army launched surface-to-air missiles to destroy a Russian satellite.

The Quadrilateral Security Dialogue (Quad), which includes the United States, Australia, India and Japan, and which was set up to cooperate following the 2004 tsunami in the Indian Ocean, and which is not a formal alliance, strengthened its ties in 2021. This was due to an increase in the level of joint concern of the leaders of these four countries with China's increasing assertiveness in the region, a situation which caused them to outline a constructive agenda of cooperation. One must bear in mind that the Indo-Pacific region spans two oceans and several continents. This fact makes it important to the United States' maritime interests. American maritime trade worth 1.9 trillion USD in 2019, and in 2021 approximately 42% of the global exports and 38% of the imports passed through this region.[15] In November 2020, these countries' navies held a joint marine exercise – the first in over a decade, and in March 2021 US President Joe Biden convened a virtual meeting of the four heads of state, in which they decided to set up working groups on COVID-19 vaccinations, climate change, technological innovation and supply-chain resilience.[16] To strengthen the alliance and to harness Australia's commitment to take an active role in the maritime battle against China, the United States and the United Kingdom agreed to assist Australia in building the next generation of Australian submarines, and to

14 Ibid, 10.

15 Trade in Goods Outlook in the Asia and The Pacific 2020/2021, UN Economic and Social Commission for Asia and the Pacific (ESCAP), p. 1.

16 Sheila A. Smith, The Quad in the Indo-Pacific: What to Know, Council on Foreign Relations – CFR, May 27, 2021.

equip them with nuclear engines.[17] The initiative, which has been named AUKUS, was announced jointly by President Joe Biden and Prime Ministers Boris Johnson and Scott Morrison. They portrayed it as a critical step toward renewal of the old alliance whose goal is to serve as a counterbalance to the Chinese attempts at extending its influence over the western Pacific Ocean and South China Sea. This decision incensed France and China – France for losing a contract to build submarines for the Australian navy worth billions of dollars, and China because this alliance alters the existing balance of power in the region.

As part of the target the United States set for itself to leave Afghanistan by the end of August 2021, the exit process itself and the transfer of control to the local administration amounted to a tremendous strategic and public relations failure. Afghanistan was overrun by Taliban forces even before the evacuation could be completed. Even though one US administration after another, since the Obama presidency, had declared their desire to leave Afghanistan, this war, which began in 2001, the longest in the United States' history, ended in the collapse of the Afghan government that had been propped up by the Americans and in total humiliation of the United States. The United States is now perceived around the world as a superpower rapidly losing its status as such, and the defeat in Afghanistan will have tremendous repercussions around the world in all matters concerning its political and military commitments, its willingness to intervene militarily and its reliability and commitment as an ally.[18] Thus for example, the reliability of the American commitment toward Taiwan against a Chinese invasion will no doubt be put to the test in the near future. This is evident from the threats coming from China, from China attempts to project its power off the Taiwanese coast and Taiwan's own willingness to defend itself.[19]

A decade after the advent of the Arab Spring, the Middle East remains an area characterized by escalating conflicts, active insurgencies in several countries, the rivalry between Iran and its proxies and other countries, persistent terrorism and protest movements which will rise from time to time, leading to violent acts of protest. The local volatility will continue so long as popular discontent and socio-economic grievances continue to exacerbate, particularly while the region is coping

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17 Kevin Liptak and Maegan Vazquez, Biden and UK to help Australia acquire nuclear-powered submarines in new pushback on China, *CNN*, September 16, 2021.

18 Martin Jacques, Defeat in Afghanistan a complete humiliation for the US, *Global Times*, August 15, 2021.

19 Tong Zhao, U.S. commitment to Taiwan under scrutiny after Afghanistan's fall, *Politico*, August 19, 2021.

with the economic crisis caused by the COVID-19 pandemic and its leaders are in the midst of a struggle due to the public expectations of political and economic reform. As a result, several countries are expected to join the dubious club of "failed states" – a situation which might trigger their economic collapse. Conflicts on the verge of boiling over could potentially lead to conflagration especially if countries like Russia, Turkey and others intervene – a development which could increase the probability of an escalation and of erroneous decision-making.

Iran considers itself committed to the struggle against the United States and its regional allies, due to its assumption that the latter are occupied with diminishing Iran's geopolitical influence in the Middle East and strive for regime change in Tehran. Iran's actions reflect its concepts regarding the hostility of the Americans, Israel and the Gulf states. Iran will continue projecting its power through its security forces (including the Iranian Revolutionary Guards) and proxies, in an effort to extract diplomatic and economic concessions from the international community. As for the United States' interests in particular, Iran's willingness to carry out attacks apparently depends on its assessment of the American readiness to retaliate, on its ability to carry out attacks without triggering a direct confrontation, and on the likelihood that by doing so they might be jeopardizing the possibility of easing the American sanctions on Iran. The leaders in the new regime of President Raisi will be hardening their political line, but will apparently continue their brinkmanship in all matters concerning the Joint Comprehensive Plan of Action (JCPOA, the nuclear deal). Iran persists in its commitment to pressure the United States, while at the same time avoiding involvement in a full-scale confrontation.[20] Iran is determined to retain its influence in Syria as part of its route toward broadening its regional influence, as it is doing in Lebanon and with Hezbollah, and will be threatening Israel. Iran will take advantage of the lingering economic crisis in Lebanon and will, through civilian assistance (including supplying oil) through Hezbollah to prevent the Lebanese government from asking the West for assistance.[21] Iran will continue its ongoing support of Yemen, since Tehran's support for the Houthis – including the supply of missiles and unmanned systems – constitutes a threat to American partners and interests, in particular through attacks on Saudi Arabia. Iran will continue posing a threat to Israel, both directly through its missile and indirectly through its support for Hezbollah and other terrorist organizations. It will try to reap the rewards of its support for the rebel forces in Afghanistan, through conducting a pragmatic policy

20 Annual Threat Assessment of the US Intelligence Community, p. 12.

21 "Lebanon's Hezbollah says Iranian fuel oil to arrive this week", *Al Jazeera*, September 13, 2021.

of cooperation with the Taliban, in order to safeguard its interests, despite the deep ideological and religious differences between them.

The American strategy in the Eastern Mediterranean remains unclear. The Biden administration has not developed a consistent policy toward Turkey, it is missing clear definition of its diplomatic goals in Libya and there are no policy goals regarding Syria's reconstruction. Even though the short-term chances of an improvement in American-Turkish relations seem slim, both countries might be able to find common ground as the Biden presidency proceeds. They have worked together to promote an intra-Afghan dialog. Turkey also frames its increasing influence in Central Asia, which is intended to dilute the Russian and Chinese hegemony in that region, as being favorable for American interests. Even if the relations between Biden and Erdogan are frostier than they were between Trump and Erdogan, and even if there are occasional flare-ups between the USA and Turkey, they are both NATO allies and they share important strategic interests which could lead to creative collaboration in the region.[22] Russia, on the other hand, continues to maintain its assertive policy in the Eastern Mediterranean as part of its wider strategy to undermine NATO and EU cohesion, thereby hindering NATO's ability to take action, to plan and form policy. Russia's interests are geared toward increasing dependency on natural gas and on the cash influx to Russia, to cultivate the governing elite and toward thwarting NATO's ability to expand, and – to a lesser extent – the European Union's ability to expand. Whereas Moscow's efforts in the region, after its intervention in Syria in 2015, are often portrayed as a means for strengthening Russia's formidable brute force, one may assume that the Russian leadership regards its actions there as part of its broader rivalry with the West, stretching from the Atlantic Ocean to the Black Sea and from North Africa to the Arctic.[23]

The maritime dispute between Turkey and Greece and Cyprus, which was discussed at length in the previous report (2020/21), has undergone a certain shift since the end of 2020: Turkey's aggressive policy has been tempered with diplomacy, which is intended to weaken the support of the European Union, Egypt and Israel for the Greek position. President Erdogan announced in December 2020 that he is interested in "turning a new page" in his relations with the European Union and in January 2021 he announced that talks with Greece on the energy exploration would be

22 Samuel Ramani, The US in the Eastern Mediterranean Region, *RUSI*, June 1, 2021.

23 Paul Stronski, A Difficult Balancing Act: Russia's Role in the Eastern Mediterranean, U.S. European Command, Stuttgart Germany, U.S. EUCOM, the Department of Defense, Carnegie Endowment for International Peace, June 2021.

"will herald a new era".[24] Furthermore, official Turkish sources noted that relations between Turkey and Egypt would improve in the near future (relations which were severed with the removal of Morsi from power in Egypt). In December 2020 the attitude toward Israel also underwent a slight shift, with Turkey announcing that Israel's gas resources could be traded more efficiently in other markets with Turkey's mediation. In response, Israel's then-Minister of Energy Yuval Steinitz announced, in March 2021, that Israel would be pleased to see Turkey in the East Mediterranean Gas Forum.[25] Erdogan's surprise conversation with Israel's new president Isaac Herzog, on July 12 2021, in which the two presidents stressed that "Israel's and Turkey's relations are of great importance to the security and stability of the Middle East and that there is considerable potential for cooperation between the two countries in many areas, in particular energy, tourism and technology" – is also consistent with this trend.[26] The phone conversation between Prime Minister Naftali Bennett and President Erdogan during the diplomatic campaign to release the Israeli couple who were arrested in Turkey for espionage is another example of this trend. In the face of long-term geo-strategic worries and short-term public opinion considerations, it is likely that Ankara will continue its two-pronged approach to Turkey's disputes in the Mediterranean – balancing arm-twisting and diplomacy. Openness to the West does not necessarily mean a softening of Turkey's policy toward Greece or toward the Republic of Cyprus. Erdogan will want to keep his options open, to watch which path leads toward better political and strategic accomplishments, including regarding Cyprus. A Greek-Turkish conflict in the Eastern Mediterranean is unlikely although it cannot be ruled out altogether. The fear of such an escalation, economic hardships and fear of harming their relations respectively with other regional powers have for the time being motivated Athens and Ankara to engage in talks on settling their maritime differences. A united trans-Atlantic front in the eastern Mediterranean might persuade both Greece and Turkey to retain their seat around the negotiating table.[27]

Finally, the east Mediterranean region requires the upholding of a new political order. In the absence of a robust, coherent and coordinated policy from the European

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24 "Turkey hopes to turn new page with U.S. and EU in 2021, Erdogan says", *Reuters*, 23 December 2020; "Erdogan hopes new Turkey-Greece talks will herald new era", *Reuters*, 12 January 2021.

25 Turkey-Greece: From Maritime Brinkmanship to Dialogue, International Crisis Group, Report No 263, May 31, 2021, p. 15.

26 Itamar Eichner, "Erdogan Calls President Herzog: 'Great Potential for Cooperation with Israel'", Ynet, July 13, 2021 [Hebrew].

27 *Turkey-Greece: From Maritime Brinkmanship to Dialogue*, p. 36.

Union and NATO, relations within the Eastern Mediterranean might become ever more volatile. At the same time, political resolutions for the maritime boundary between Greece and Turkey, the Cyprus issue and the conflict in Libya, which should be based on the rule of law and on the existing political situation, have the potential at present to favorably affect the entire Mediterranean region, and to reset the Turkey-EU relations. They may also affect the future of the cooperation between the European Union and the Mediterranean and North African (MENA) countries.

The Red Sea Region, Arabian Sea and the Persian Gulf

The east and west coasts of the Red Sea have, in recent years, become a shared political and security arena in which the world powers, as well as the countries of the region, have significant interests, especially in concerning the free trade passing through the Red Sea and Gulf of Aden. Its annual value is estimated at approximately $700 billion. The effects and consequences of the six-day Suez Canal blockage in March 2021 by the *Ever Given* container ship exposed the great strategic importance of the Red Sea as a transit route for oil and global trade.[28] From a geopolitical standpoint, there are multiple state interests involved in this region, and which underpin the close link between its two shores: the Arabian peninsula and the Horn of Africa. The increase in the number of new military ports and installations along the coastal regions of Sudan, Eritrea, Djibouti and Somalia highlights the critical relevance of the East African countries to the Gulf states and also to other foreign powers involved in the region, such as Russia, Turkey or China. At the same time, state players in the Horn of Africa are leveraging their strategic position to attract investment, and are enabling the world powers to strengthen their presence in this region.

This area, as well as the Gulf of Aden and the Persian Gulf have in the past year been at the center of international tensions. Tensions between Iran and the Gulf states has always underpinned the regional instability. However, following the United States' withdrawal in 2018 from the JCPOA nuclear agreement with Iran under the Trump administration, the covert wars between Israel and Iran and between the United States and Iran, which had until then taken place on land and in the air, have spread also to the waters of the Persian Gulf, the Gulf of Oman and the southern Red Sea. Besides these main rivalries, this battle must be viewed also as part of the struggle between the bloc of Shiite states, led by Iran, and the Sunni bloc in the Middle East,

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28 Suez Canal blockage: 4 of the biggest trade chokepoints, *Deutsche Welle*, March 27, 2021.

and the states belonging to the Gulf Cooperation Council – GCC.[29] An expansive article in the New York Times about the secret maritime war between Israel and Iran, which is intended to force more severe restrictions on Tehran, warned that the war "risks turning hot with a single mistake". The paper notes that since 2019, Israel has been attacking ships carrying Iranian oil through the eastern Mediterranean and the Red Sea, thereby opening up a new maritime front.[30] The most recent incident occurred at the end of July 2021 east of Oman, when the *Mercer Street* tanker came under attack. The tanker is operated by an Israeli-owned company; the attack was carried out using drones which were launched against it by a force of the Iranian Revolutionary Guards and killed one British and one Romanian citizen, both members of the tanker crew – a fact that ratcheted up the conflict by a notch.[31]

The Red Sea itself is rife with regional and international geopolitical barriers, and this is particularly acute at its choke points. The Straits of Hormuz have been and are still subject to Iran's proximity and threat. The war in Yemen and Iran's support for the Houthi rebels has subjected the Red Sea, especially its southern part, to geostrategic and geopolitical threats similar to those in the Persian Gulf.

The western shores of the Red Sea and the Horn of Africa have also become the focus of geopolitical changes: the ambition, on the part of the United Arab Emirates and Saudi Arabia on the one hand, and of Turkey and Qatar on the other, to achieve control over the Horn of Africa, has destabilized the region and added a dimension of insecurity in a region already synonymous with ungovernability. The rivalry between Egypt, Sudan and Ethiopia over the Nile waters has remained unresolved and presents potential for future disputes among these countries. Severe armed conflicts are continuing in Somalia, South Sudan, Sudan and Yemen, involving states from both sides of the Red Sea. This rivalry between the Middle Eastern players is the elevation of the strategic rivalry between the United States and China and Russia to a top priority in national security.

The Coronavirus pandemic and its impact on the international system

The Coronavirus outbreak in 2019 has created a sense of vulnerability and helplessness around the world, a fact which has altered everyday life with a speed and intensity

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29 A multilateral framework of littoral states along the Red Sea and Gulf of Aden, established by Saudi Arabia in 2018 in an effort to collaborate on security issues and improve stability in the Red Sea region.

30 Israel's Shadow War with Iran Moves Out to Sea, *The New York Times*, August 3, 2021.

31 Tanker attack: UK and US blame Iran for deadly ship attack, *BBC News*, August 2, 2021.

that has not left any aspect of our lives unaffected. The impacts of the pandemic are far-reaching. They extend far beyond global health and reach into the economic, political and security spheres. The expectation is that COVID-19 will remain a threat to populations worldwide until the vaccinations and treatments which will be proven efficacious will achieve wide distribution throughout all segments of the populations worldwide. The economic and political implications of the pandemic will continue to crop up for many years to come.

The year 2021 has been the year in which the theoretical debates over Chinese ascendance, the possibility of a Cold War between the United States and China, the inefficiency of the existing multilateral order, the denial of economic globalization forces, the splitting up of reasonable trade and technology regimes into a large-scale power conflagration – all these have become real operational challenges the world order and individual countries have been compelled to cope with in real time. Some of these trends were evident even before the pandemic hit the world but the pandemic has served as an accelerant, and they are persisting, albeit in different ways. It would be fair to say that the pandemic really did change the world around us quite substantially. The pandemic has affected international relations and has caused diplomatic tensions. It has also led to a UN Security Council resolution calling for a global ceasefire. It has raised the demand to rethink the existing approaches in international relations, with greater emphasis on issues such as health diplomacy,[32] crisis politics,[33] and frontier politics. The diplomatic relations were impacted due to tensions around trade and the transport of medications, diagnostic tests and hospital equipment for COVID-19. Leaders of certain countries accused other countries of failing to contain the disease effectively, which resulted in uncontrolled spreading of the virus. Several countries, such as China and Russia, are offering medical equipment and vaccinations as a tool for improving their geopolitical status. Developing countries in Latin America and Africa are unable to procure sufficient materials for Coronavirus testing due in part to the fact that the United States and European countries are expending their resources to procure those same materials.

Now that two years have passed since the outbreak of the pandemic, mankind is more acutely aware of the suddenness and intensity with which unforeseen changes can occur in the world with no advance warning. The pandemic was a powerful reminder of the inadequacy of existing systems to provide alarms and advance

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32 Fazal, Tanisha (2020). "Health Diplomacy in Pandemical Times". *International Organization*. 74: E78–E97

33 Lipscy, Phillip (2020). "COVID-19 and the Politics of Crisis". *International Organization*. 74: E98–E127

warning in similar situations and also of the lack of readiness to deal with similar crises in the future.

The pandemic exposed just how dysfunctional the international system really is. The UN Security Council provided the most glaring example of this. In the face of one of the greatest challenges mankind has ever faced, it was only on July 1 2021 that agreement was reached on Resolution 2532, which called for a 90-day "humanitarian pause" in armed conflicts around the world, with the exception of conflicts with specific terrorist groups. This was supposed to be an important resolution but in practice, it had negligible impact. There was only one solitary case where such an ongoing conflict took the resolution seriously and took steps to pause hostilities – the case of the Colombia National Liberation Army's conflict with the Colombian army. The United Nations declared that it recognizes that the COVID-19 pandemic is more than just a health crisis; it is an economic crisis, a humanitarian crisis, a security crisis and a human rights crisis. It has accentuated the severe fragility and inequality within and among countries, and that in order to emerge from this crisis, a holistic approach on the part of society, government and the entire world will be required – an approach driven by compassion and solidarity. In June 2021, the United Nations Secretary General launched his memorandum on a comprehensive response to the COVID-19 pandemic intended to save lives, protect societies and better recover. The memorandum noted that "Seventy-five years after the last world war, the world has found itself yet again in a global battle. This time, all of humanity is on the same side against coronavirus disease, or COVID-19".[34] The response is based on three principles: 1) a massive, coordinated, comprehensive healthcare response, directed by the World Health Organization (WHO), 2) a concerted effort to attend to the socio-economic, humanitarian and human rights aspects of the pandemic, focusing on saving lives, guaranteeing accessibility of vital services, a functioning food supply chain and safeguarding human rights, 3) a recovery process to emerge from the crisis, including the opportunity this process provides for dealing with the climate crisis, the inequality, exclusion, gaps in the social defense systems and other injustices exposed during the crisis.[35] This plan does not provide a solution for the tensions which have already developed around the geopolitical issue of the manufacture of the vaccines and their distribution, the trade and transport of medicines, diagnostic examination kits and hospital supplies for fighting the Coronavirus and the prioritization of vaccinating populations in countries with strong economies over

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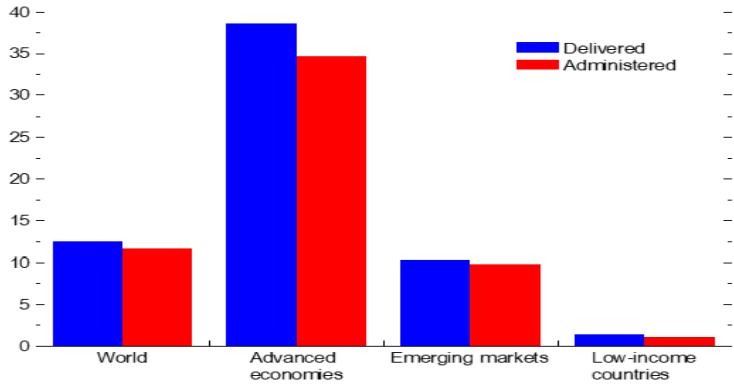
34 United Nations Comprehensive Response to COVID-19: Saving Lives, Protecting Societies, Recovering Better, Executive Summary, June 2021, p.1.

35 Annual Threat Assessment of the US Intelligence Community, p. 2.

third world countries (figure 1). In this context, voices among UN member states calling for a change in the United Nations and Security Council statutes have become ever more vociferous – for example the President of the General Assembly, Volkan Bozkir – however it does not seem that they will be receiving any backing, especially not from the permanent members of the Security Council.[36]



Sources: Airfinity; and IMF staff calculations.
Note: Latest data available are for July 6, 2021. Bars show the ratio of vaccine courses needed for full vaccination (two doses generally, but one dose for Johnson & Johnson and CanSino) either delivered or administered to population by WEO economy group.

Figure 1: Percentages of vaccinations in different groups of countries

The economic impact of the Coronavirus pandemic

It is difficult to estimate accurately the extent of the damage caused to the global economy by the Coronavirus, however there is a broad consensus among economists that it is going to have a severe negative effect (Figure 2). Early estimates predicted that if the virus goes global, most large economies would lose at least 2.9 percent of their GDP in 2020. This forecast has already been revised to a product loss of 4.5 percent (meaning relative to the global GDP which was $87.55 trillion in 2019 – a drop of almost $3.94 trillion).

The economic downturn due to the Coronavirus pandemic, along with conflicts and extreme weather conditions, have raised the level of food insecurity worldwide to its highest point in over a decade, a factor which increases the risk of instability. The number of people suffering from high levels of acute food insecurity has doubled

[36] Security Council reforms must reflect 21st century realities, says UN Assembly President, Peace and Security, *UN News*, January 21, 2021.

from 135 million people in 2019 to approximately 270 million in 2020, and this number is expected to increase to 330 million by the end of 2021.[37]

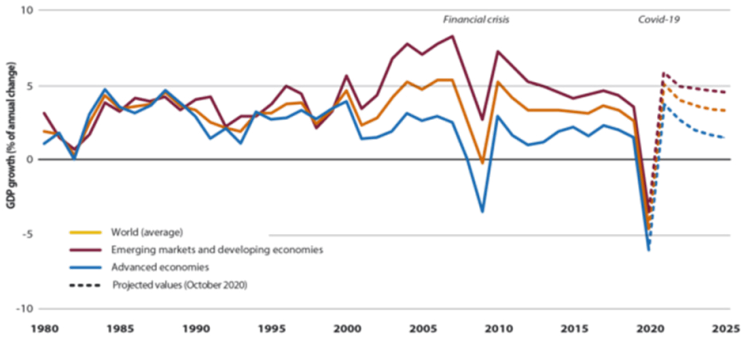


Figure 2: GDP fluctuations, 1980–2020

The economic damage caused by the COVID-19 pandemic is driven mostly by a drop in demand, meaning there are less consumers willing to purchase the goods and services on offer in the global economy. This dynamic is clearly seen in the industries that have been the worst-hit, such as travel and tourism.

As of August 2021, global economic growth is expected to be 5.8%, a sharp uptick from the December 2020 economic forecast (which foresaw 4.2% growth). This improvement has been made possible thanks to the distribution of the vaccinations in many of the developed economies. Another reason is the sizable extra budget allocated for this purpose in the developed economies.[38] The economic forecasts have dissipated among the countries since the April 2021 World Economic Outlook (WEO). The vaccination approach emerged as the main fault line along which global recovery divided into two blocs: those that can expect continued normalization of the business activity over the rest of the year (almost all the developed economies) and those that will still be grappling with recurring infections and increased mortality from COVID-19 (figure 3). Recovery, nevertheless, is not guaranteed even in those countries where current infection rates are very low, so long as the virus increases its impact on the non-vaccinated countries and creates new variants, more resistant to the vaccinations.[39]

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37 Annual Threat Assessment of the US Intelligence Community, p. 17

38 OECD Outlook, Global prospects are improving but performance diverges strongly across countries, Organisation for Economic Co-operation and Development – OECD, May 2021.

39 Fault Lines Widen in the Global Recovery, World Economic Outlook Update, International Monetary Fund, July 2021.

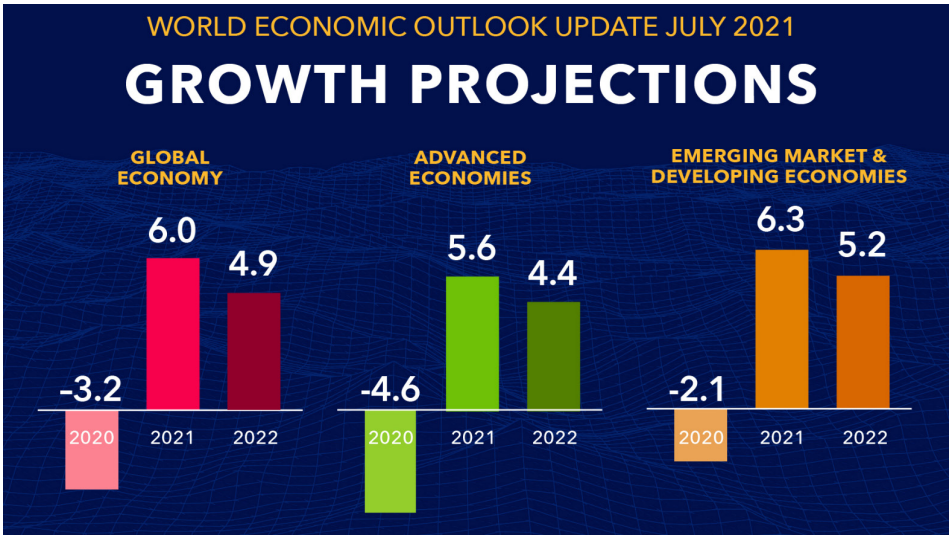


Figure 3: Global Recovery Projection

Global Trade

Global trade in goods grew by 2.1% in the first quarter of 2021, which is equivalent to an annual growth rate of 8.7%. The year-to-year growth in the same period grew to 4.3%. Larger growth is expected in the second quarter due to the sharp drop in the same quarter last year. The current rate of recovery generally matches the WTO's most up-to-date forecast from March 31, 2021, which foresaw an 8.0% growth in the trading of goods worldwide in 2021 and 4.0% in 2022. Unequal access to COVID-19 vaccinations continues to be the greatest threat to the economic concept since the failure to protect all people regardless of income leaves whole populations vulnerable to more waves of infection. Even though global trade is showing signs of withdrawal from the slump caused by COVID-19, economists warn that any recovery this year might be interrupted by the effects of a continuing or proliferating pandemic, which will result in pressure on many governments to focus on the internal economic stability of their countries.[40]

The trade in goods in dollar terms of the USD also showed robust recovery during the first quarter – a 14% increase from 2020, due to the combination of a rise in quantities and higher prices. The sharp decline and the subsequent recovery since early 2020 reflect the trends in trade in manufactured goods, whereas in other

[40] Annual Threat Assessment of the US Intelligence Community, p. 17

product categories the contributions were smaller. The prices of basic commodities decreased during the first wave of the pandemic, however since then they have been rising steadily, adding to the rise in the fuels, mining products, and agricultural commodity sectors. In May 2021, prices had risen by 194% (compared to 2020) in fuels, 54% for metals, 45% for food and 26% for agricultural raw materials, according to the main commodity price data of the International Monetary Fund.[41]

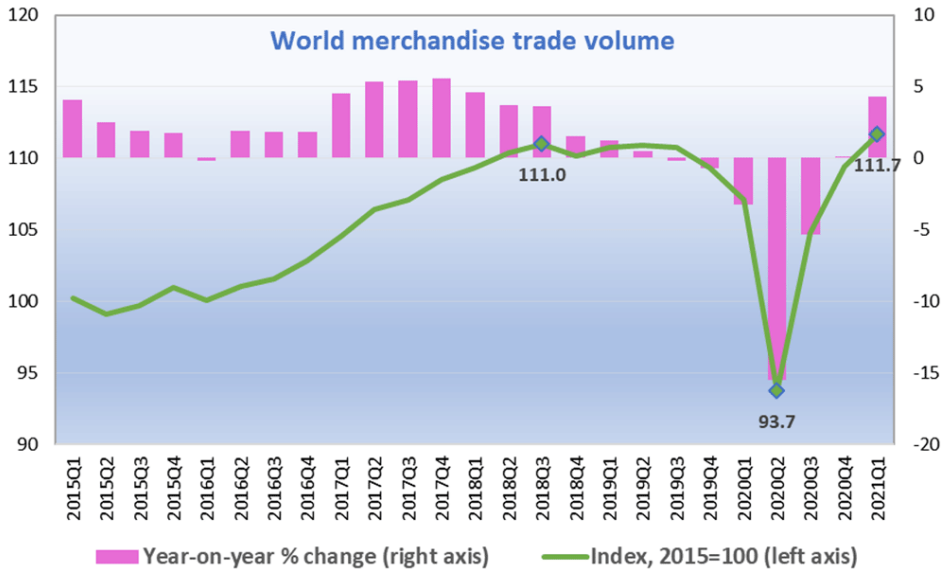


Figure 4: Global trade by volume, quarterly 2015–2021, Source: WTO and UNCTAD.

As mentioned earlier, the six-day blockage of the Suez Canal in March 2021 by the giant container ship the *Ever Given*, exposed the vulnerability of the important choke points (of which the Suez Canal is one) to malfunctions, accidents, terrorism and other scenarios whose impact on the world supply chain and their damage potential to the global trade and economy can be quite formidable. Several articles on this issue have even coined a new term – weaponisation of choke-points.[42]

41 Merchandise trade posts strong gains in first quarter despite growing regional disparities, World Trade Organization (WTO), Economic Research and Analysis, June 24, 2021.

42 Fillip Medunic, A glimpse of the future: The Ever Given and the weaponisation of choke-points, European Council on Foreign Relations, April 23, 2021.

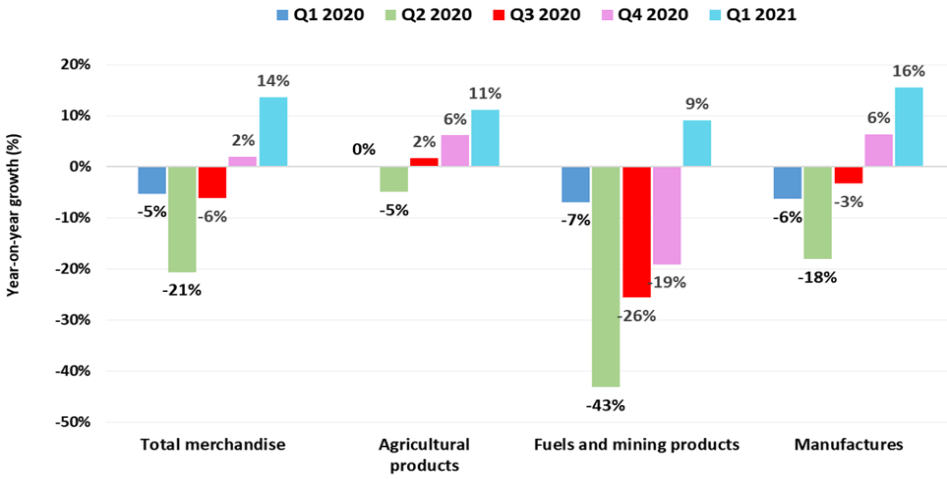


Figure 5: Merchandise trade values Source: WTO estimates.

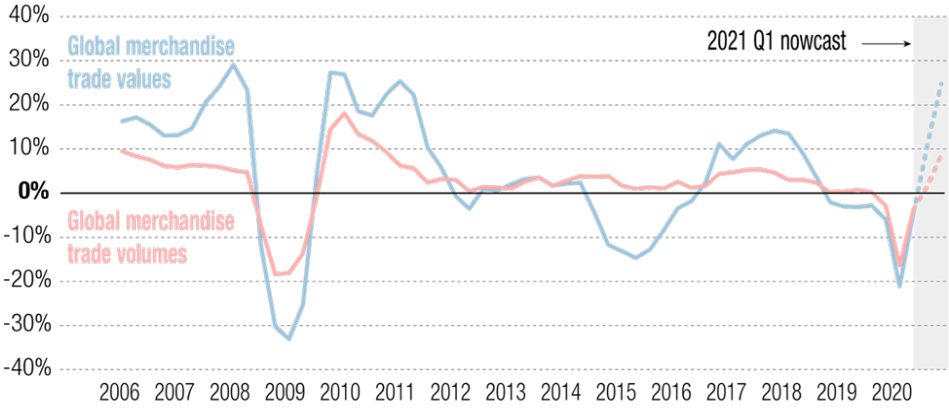


Figure 6: Recovery of global trade in 2021

China's trade surplus

China's trade surplus stood at $56.58 billion in July 2021, compared with a surplus of $60.5 billion the same month in 2020. This is the largest surplus since January against a backdrop of rising goods prices and despite reduced world demand due to the rapid spread of a new variant of the Coronavirus and extreme weather. The trade surplus with the United States increased in the first half of 2021 to $200.32 billion compared with $164.92 billion in the second half of 2020.[43]

[43] China Balance of Trade, Trading Economics [Accessed August 23, 2021].

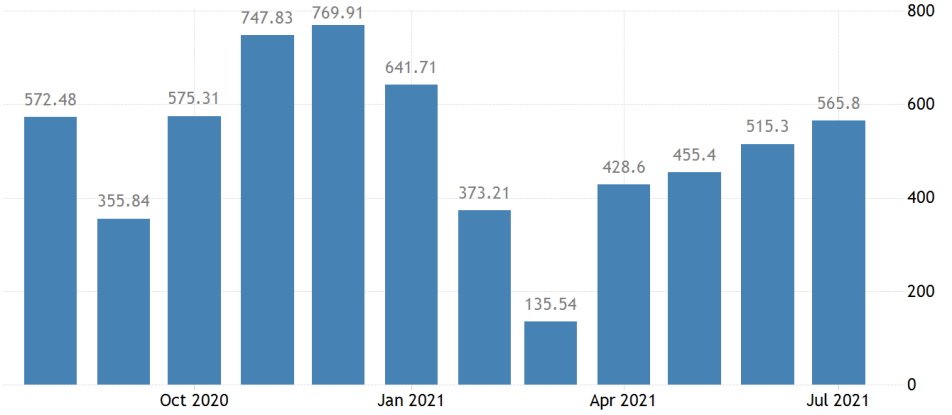
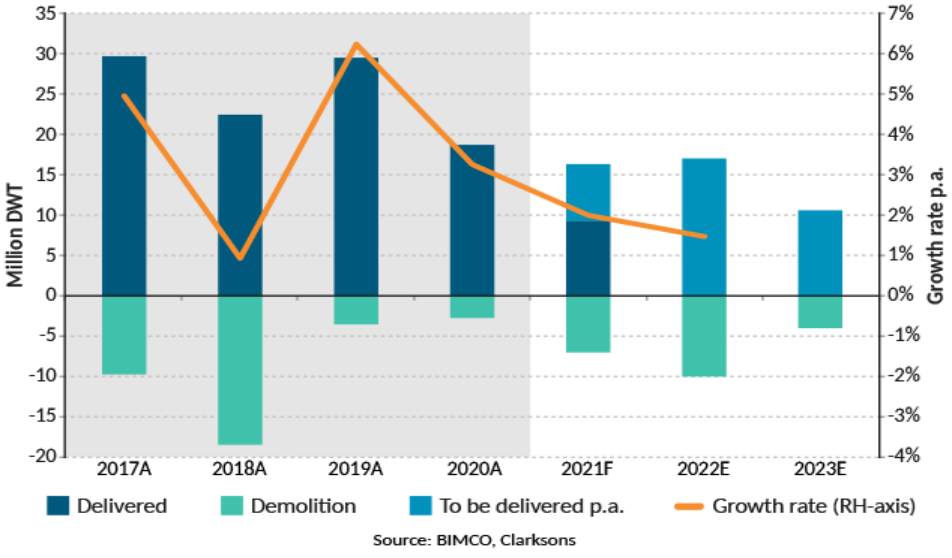


Figure 7: China's trade balance 2020–2021



A is actual. F is forecast. E is estimate which will change if new orders are placed. The supply growth for 2021-2023 contains existing orders only and is estimated under the assumptions that the scheduled deliveries fall short by 10% due to various reasons and 25% of the remaining vessels on order are delayed/postponed.

Figure 8: Increase in crude oil tanker fleet 2017–2023

Demand for oil and the state of the tanker fleet: despite the unfavorable market conditions, crude oil tankers have proven to be a commodity worth building in the shipyards. In total, 44 new crude oil tankers were ordered by the middle of 2021. More than half of these (27) are of the Very Large Crude Carriers (VLCC) class with an average capacity of 303,000 draft weight tons (DWT), which are scheduled for delivery in the fourth quarter of 2022 and in 2023. Product tankers, on the other

hand, have proven themselves to a lesser extent and only about 36 were ordered in 2021, 28 of which are Medium Range Tankers.[44]

Climate change and its environmental impact

The prevailing assessment worldwide today is that the impacts of climate change and the continued environmental degradation will cause a combination of direct and indirect threats, including threats to the economy, political instability, increased population displacement and new sources for geopolitical rivalries, which will be unfolding in the coming decade and beyond. The scientists warn that the rising air, land and sea temperature will cause more frequent, more varied extreme weather conditions including heat waves, droughts, and floods which will pose a direct threat to the interests of countries such as the United States, if the means for coping with these situations are not adopted. The degradation of the quality and the depletion of land, water and biodiversity resources will almost certainly pose a threat to infrastructures, health, water, food and security – in particular in many developing countries lacking the ability to adjust quickly to changes. This will increase the potential of conflict in the competition for scarce natural resources.

The new report published on August 9, 2021 by the team of climate scientists working on behalf of the United Nations, which was prepared by 234 scientists from 66 countries, is based on thousands of scientific studies and research done by scientists all over the world. It presented important information regarding the severity of the climate crisis engulfing mankind. The main finding in the report is that "human influence has warmed the climate at a rate that is unprecedented in at least the last 2000 years".[45] The importance of this report is in its eroding the ability to remain in denial of the severity of the situation – a position still held by institutions and organizations and also by many people around the world. The report has established broad understanding of the means necessary for preventing the crisis and the preparations that need to be made to cope with the impacts, however we are still having difficulties understanding rapidly enough how to change and what needs to be done. In order to make a real difference, already in the coming decade there will be a need for significant measures of transitioning to a low-carbon economy for energy production, farming practices which reduce methane gas emissions while substantially reducing meat consumption, and transport based on

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44 Peter Sand, Tanker Shipping: Temporary Shocks Provide Little Support for Desperate Tanker Market, *BIMCO*, June 2, 2021.

45 The Physical Science Basis, Summary for Policymakers, Climate Change 2021 The Intergovernmental Panel on Climate Change, IPCC AR6 WGI, p. 8.

fossil fuel substitutes. At the same time, it will be necessary to develop cities better capable of withstanding extreme weather events, to protect beaches and preserve large ecosystems which will improve our resistance to the crisis and will absorb part of the greenhouse gases.

As for the maritime domain, the report mentions that between 2011–2020, the average ice coverage in the Arctic Ocean reached its lowest level since 1850 (with a high degree of certainty) at the end of the summer, and the ice coverage in the Arctic Ocean was the smallest in the past 1000 years (with a medium degree of certainty). This phenomenon is global, and practically all glaciers worldwide are receding since the 1950s more or less at the same rate.

The climatic arming has caused an average rise in sea levels following glacial melting and the warming of the ocean waters. The rise in seawater temperature explained 50% of the sea level rise in 1971–2018, while ice loss from glaciers contributed 22%, icesheets 20% and changes in land water storage – 8%. These two factors have been the main contributors to the global sea level rise in 2006–2018.[46]

Cyber space

Cyber attacks aim at stealing data, influence populations and sabotage industry, including critical, physical, and digital infrastructures, and will continue to pose a threat to countries and global corporations around the world. Despite the improved capabilities of states and non-state players in cyberspace, the main concern in the western world is from Russia, China, Iran and North Korea. The growing use of cyberspace by states as a tool for national power, including the growing use by armies around the world, increases the likelihood of more damaging, more harmful cyber activity. As countries attempt to carry out ever-more aggressive cyber activities, the greater is the likelihood that civilian populations will be impacted and that other countries seeking similar outcomes will be emboldened. Authoritarian, non-liberal regimes around the world will increasingly exploit digital tools to monitor their citizens, to curtail freedom of expression, to increase censorship and to manipulate information to control their populations. Regimes will be carrying out more and more cyber hacks affecting citizens beyond their borders as part of broader efforts to find foreign populations and influence them. Over the past decade, hackers working in the service of their state have hacked into software networks and IT services and have assisted in the conduct of operations – espionage, sabotage, and prepositioning for a state of war.

46 Ibid, p. 9.

Analysts have found that in the coming years, the global cost of cyber-attacks might total approximately $600 billion per annum (approximately 0.8% of the world GDP).[47] If cybercrime worldwide was to be measured in terms of state economics, in 2021 they are expected to cause damage totaling six trillion USD – a monetary figure that places them as the third largest economy in the world after the United States and China. Cybersecurity Ventures expects that the global costs of cybercrime will increase by 15 percent in the next five years and will reach $10.5 trillion per year by 2025, as opposed to three trillion USD in 2015.

In 2017, the Maritime Safety Committee of the International Maritime Organization (IMO) adopted rules (Resolution MSC.428 (98)) for maritime cyber risk management in safety management systems. The resolution encourages executives in shipping companies to ensure that cyber risks are dealt with properly in the existing safety management systems (as defined in the ISM code) no later than the first annual verification of the company's compliance document following January 1, 2021.[48] In October 2020 the organization's website itself was taken down for a few days due to a cyber-attack. The attack occurred several days after the giant shipping company CMA CGM belonging to Shipping Giant was hit by a ransomware attack.[49]

In this age of Coronavirus pandemic, the greatest cyber threat lies specifically in the shipping and ports sector: the pandemic has accelerated the digitization, which was already underway around the world, due to people being instructed to work from home over the Internet. The shipping and ports sector was thus compelled to rely more and more on Internet communication. This meant that the ships themselves were required to remain online continually, increasing their vulnerability to cyber-attack. This situation became even more acute since a large proportion of the systems and computers on the ships are based on old, complicated operating systems, a fact that is detrimental to their immunity to cyber-attacks.

Immigration and Refugees

Immigration from the Middle East and North Africa to Europe has continued its decline since its peak in 2015 (1,032,048) and in August 2021 stood at 62,705

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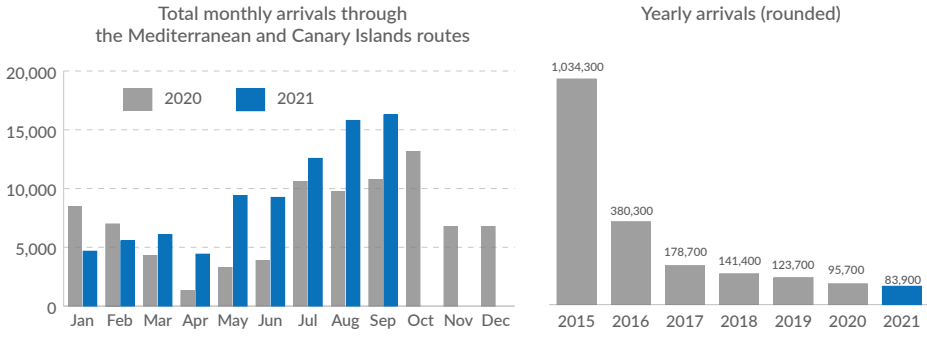
47 Steve Morgan, Cybercrime to Cost The World $10.5 Trillion Annually By 2025, *Cybercrime Magazine*, November 13, 2020.

48 IMO 2021 Cyber Security Compliance for Maritime Information Center for the new IMO 2021 regulation, Resolution MSC.428(98).

49 Mike Schuler, Shipping Giant CMA CGM Hit by Ransomware Cyber Attack, *gcaptain,* September 28, 2020.

migrants, 58,364 of whom arrived by sea while 1,183 lost their lives or went missing (figure 9). Most of the migrants arrived in Italy (36,830), Spain (19,236), Greece (5,124), Cyprus (1,190) and Malta (325) (figure 10).



[1] Dead and missing figures refer to the Mediterranean and Canary Islands routes. Information is compiled from a variety of sources, the quality and reliability of which can vary. While every effort has been made to ensure that all statistical information is verified, figures on some arrivals, as well as dead and missing at sea, represent an estimate. Triangulation of information and sources is performed on a continuous basis. Therefore, amendments in figures may occur, including retroactively.
[2] Includes sea arrivals in Canary Islands (Spain) via the Atlantic Ocean.
[3] Includes sea and land arrivals in Spain via the Western Mediterranean route.
[4] Includes sea arrivals in Italy and Malta.
[5] Includes sea and land arrivals in Greece and sea arrivals in Cyprus.

Figure 9: Immigration to Europe, 2015–2021[50]

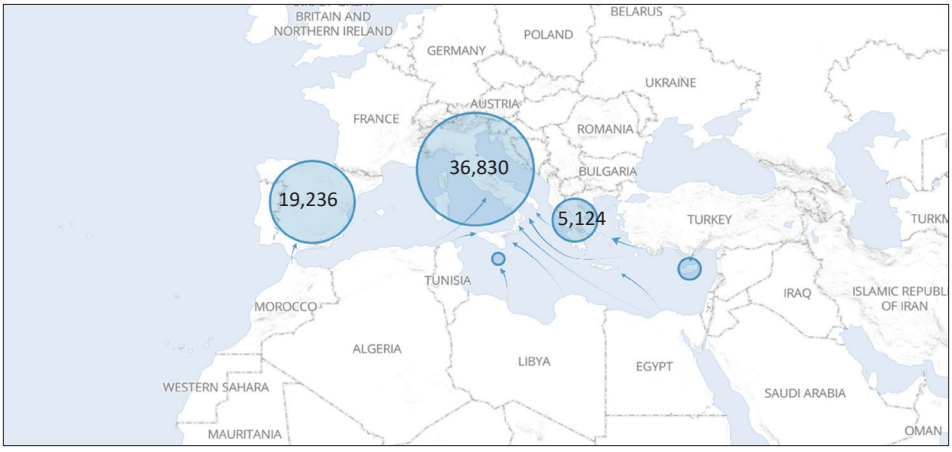


Figure 10: Immigration to select European countries

The restrictions on movement and the curfew imposed due to the COVID-19 pandemic impeded the migrant traffic. However, new conflicts in the Middle Eastern and North African countries (Lebanon and Libya for example) are likely to trigger

50 Europe Situations: Data and Trends, Arrivals and Displaced Populations, Regional Bureau for Europe, September 2021.

new waves of migration. It is expected that maritime migration routes will continue to be the main routes for the migrants en route to Europe. At the same time, the situation in the Middle East remains volatile in all matters concerning refugees: in 2020 there were still approximately 5.6 million Syrian refugees due to the Syrian civil war registered in Syria's neighboring countries. This situation will cause the crisis to linger and will remain the world's greatest displacement crisis. A severe economic crisis, which has been exacerbated by the Coronavirus pandemic, will continue to affect the humanitarian condition of the displaced persons as well. Following the stabilization of the Assad regime, some of the displace persons are expected to return to Syria, particularly to areas where relative stability has been restored,

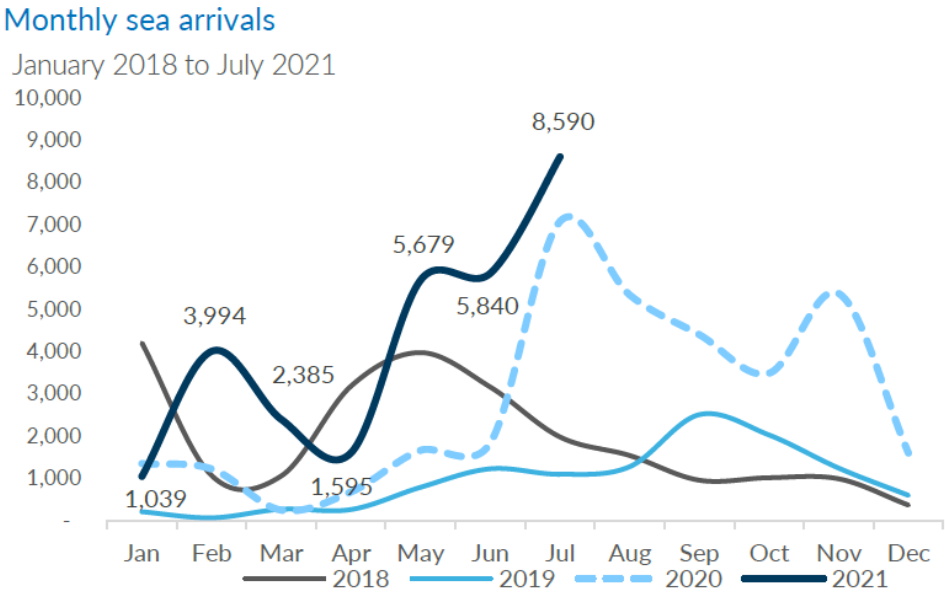


Figure 11 Distribution of arrivals in Italy by month, 2018–2021 (source: UNHCR July 2021)

subject to restrictions on borders, movement and travel due to the Coronavirus pandemic.[51] Since mid-2020, close to 4 million refugees and asylum seekers have been staying in Turkey under temporary protection. Of these, 3.6 million are Syrians. The Coronavirus pandemic has exacerbated the already-difficult situation the refugees and of their Turkish hosts. From mid-2020, approximately 121 thousand asylum seekers have been in Greece.[52]

[51] UNHCR Global Appeal and Update 2021, Regional Summaries, The Middle East and North Africa, Major Situations and Operations in the Middle East and North Africa in 2021, p. 93.

[52] Ibid, p. 90

In the first half of 2021, at least 1,146 people perished in their attempts to migrate to Europe, a substantial increase compared with the same period in 2020 (513) and 2019 (674). The Mediterranean Sea is the main arena in which 896 people drowned in their attempts to reach Europe during this time of year (January to June 2021) – a 130% increase compared with the same period in 2020 (table 1). The largest number of fatalities was recorded in the central Mediterranean migration route (741), compared with (149) that lost their lives in the route traversing the western Mediterranean. Six people died in the eastern Mediterranean en route from Turkey to Greece. In the same period, at least 250 people died in an attempt to reach the Canary Islands from West Africa via the Atlantic Ocean.[53] Thus, despite the fact that the percentage of migrants via the sea is significantly lower than the middle of the past decade, there is a marked increase in the number of migrants losing their lives at sea attempting to reach Europe.

Table 1: Number of fatalities in the migration route in the Mediterranean Sea, 2014–2020

Year	Reached Europe*	Dead and missing
2020	95,031	1,401
2019	123,663	1,335
2018	141,472	2,270
2017	185,139	3,139
2016	373,652	5,096
2015	1,032,408	3,771
2014	225,455	3,538

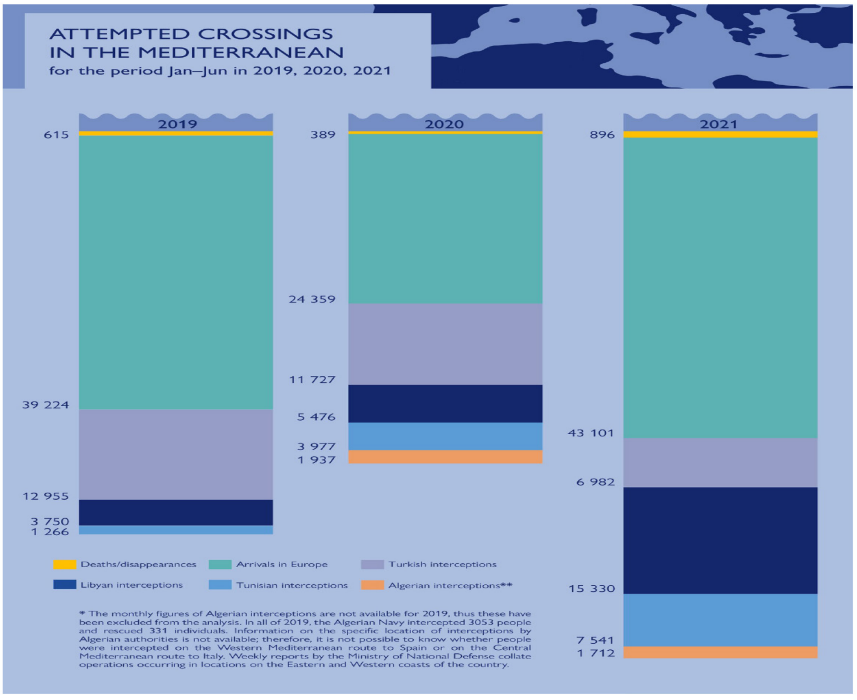
* Include sea arrivals to Italy, Cyprus, and Malta, and both sea and land arrivals to Greece and Spain (including the Canary Islands). Data are as of 31 December 2020 for all countries except Cyprus for which last available data are as of 31 August 2020.

The American withdrawal from Afghanistan in the summer of 2021 triggered yet another wave of refugees, most of whom are traveling overland toward Iran and Turkey. For the time being, Turkey is making it difficult for them to enter its territory.[54] Turkey has been hosting one of the world's largest refugee populations since 2016, when it signed an agreement with the European Union to assist in solving the refugee crisis – in exchange for money transferred to it from the European Union. According to estimates, almost five million refugees, mostly from Syria, are living in the country. They received a mixed welcome, under the best of circumstances, since xenophobia directed at anyone of Arab origin is widespread in Turkey. There

53 Andrea Garcia Borja and Merna Abdelazim, Migrant deaths on maritime routes to Europe in 2021, International Organization for Migration (IOM) and Global Migration Data Analysis Centre (GMDAC), p.4.

54 Turkey reinforces Iran border to block Afghan refugees, *The Guardian*, August 23, 2021.

is a fear among the Turkish population that following the United States' withdrawal from Afghanistan, the flow of refugees arriving in its territory will increase. President Erdogan seems to be using the refugees as a bargaining chip for his domestic and foreign policy: on the one hand he tells the West that Turkey is not prepared to be "Europe's refugee warehouse" while on the other hand claiming that Turkey needs to alter the agreement signed with the European Union in order to continue receiving refugees in its territory.[55]



Source: Missing Migrants Project, Spanish Ministry of the Interior, Italian Ministry of Interior, Hellenic Coast Guard, Turkish Coast Guard, Libyan Coast Guard, FTDES, Algerian Ministry of Interior.

Figure 12 Attempted Mediterranean crossings to Europe, January–June 2019/20/21, Source: Italy's ministry of interior and the Italian coastal guard

Terrorism and maritime terrorism

In 2021 the number of terror attacks worldwide declined, partly due to travel restrictions imposed to reduce the spread of the Coronavirus pandemic. However, in Southeast Asia, the Sulu-Celebes Sea connecting Borneo and Sulawesi with

55 Sertan Sanderston, "Turkey turns against migrants as fears of Afghan refugee crisis grow". *Info Migrants*, September 7, 2021.

Mindanao via a lengthy archipelago, has become a hotbed of criminality, terrorism and piracy.[56]

ISIS and al Qaeda have remained the most formidable Sunni terror threats to the West, and in terms of their intentions, they would like to carry out terrorist attacks inside the United States and its allies, or against American military installations outside the United States. The Lebanese organization Hezbollah might launch attacks against Israel, and possibly against American targets in case the situation in Lebanon should deteriorate. While the American forces were leaving Afghanistan, two suicide attacks were launched on August 26 near the Hamid Karzai International Airport in Kabul. This was one of the worst attacks against American and western targets in the country in the last decade. The Islamic State in Khorasan Province, (ISKP) organization, a branch of ISIS in Afghanistan, claimed responsibility for the combined attack that killed at least 60 people including 13 American servicemen and injured another 140. Following the United States' and NATO countries departure from Afghanistan, the Taliban militia that wrested control over the country might become a critical link in the international jihadist movement, stoking hostility against non-Sunni Muslims and against modernity as well. Afghanistan under the Taliban might once again become a supplier of terrorists to carry out terrorist attacks worldwide, terrorists that will be in possession of technological knowledge and will even (whether or not this will be known to the authorities) be providing them with a safe haven.

On January 5, 2021, the leader of the Al Shabaab, Abu Obeida, called upon his followers to intensify their attacks against American and Israeli targets as well as against French targets due to its "crimes" against the Prophet Mohammed's honor. The organization marked the anniversary of the attack it carried out in the Simba refugee camp in Kenya, and stressed that this was revenge for American crimes against Muslims in Somalia. The organization's leader added that this was also part of a series of attacks under the banner of "Jerusalem will not be Judaized", following the Trump administration's decision to move its embassy in Israel to Jerusalem.[57] One must remember that since 2019 the organization has been launching attacks against African Union bases, Somali government installations, officials and the security forces, the United States and European Union forces and against targets in neighboring Kenya and Ethiopia. The Red Sea is one of the world's most important trade routes – a conduit for the global trade between Europe and Asia, and it can

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56 Aminuddin Albek, Understanding and Combating Piracy in the Sulu Sea, *Royal Australian Navy*, Seapower Soundings, Issue 21, 2021.

57 Al-Shabaab terror group calls to attack Israeli, American, French targets, *Cleveland Jewish News*, January 5, 2021.

also serve as a target for the activities of terrorist organizations that know that if this route is disrupted, or should it come under threat, the impact on the global economy will be extremely significant. European countries call for protection of the trade routes in the Red Sea and Gulf of Aden are vital interests of the global superpowers, as well as of all of the countries in the region.[58]

Extraordinary maritime terrorist attacks were carried out in 2021 by forces of the Iranian Revolutionary Guards as part of the covert maritime battle that has been raging in the past two years between Israel and Iran in the Red Sea and in the Mediterranean Sea. 2021 marked a turning point in terms of the Iranian response. They chose to use the naval forces of the Revolutionary Guards and targeted commercial ships with only indirect links with Israel (not under Israel's flag and not registered in Israel). Thus, the naval branch of the Iranian Revolutionary Guards launched several maritime terrorist attacks in 2021: On February 25 2021, forces of the Iranian Revolutionary Guards attacked the *Helios Ray*, a large vehicle ferry for transporting cars, owned by Rami Unger, which was sailing under a Bahamas flag en route to Dammam in Saudi Arabia. Limpid mines were attached to the ship above the waterline and none of the crew were hurt. Damage to the ship was minor. On March 24, the container ship *Lori*, owned by Panamax, and which is managed by the Israeli company XT, came under attack off the Omani coast. The vessel was on its way from Tanzania to India when it was detained for three hours before being allowed to continue on its journey. The attack caused no severe damage, there were no injuries, and the ship continued to its destination in India. On April 13, the vehicle ferry *Hyperion Ray*, belonging to Israeli businessman Rami Unger was attacked by Iranian Revolutionary Guards forces east of Fujairah in the United Arab Emirates. The attack was apparently retaliation for the attack against the ship *Saviz*. On the night of July 29/30, 2021, the Japanese oil tanker *Mercer Street*, owned by Zodiac Maritime – managed by the Israeli Eyal Ofer was attacked by Iranian drones near the coast of Oman. This attack was exceptionally severe since two crew members were killed (of British and Romanian nationality). The tanker was being escorted by the American aircraft carrier *USS Ronald Reagan*. An investigative crew boarded the attacked ship to document and investigate the incident. This extraordinary attack triggered exceptionally severe diplomatic response by the United States and Britain. A team from the US Central Command, which investigated the attack, concluded that the severe damage to the tanker was the result of an attack by a third drone

58 Shaul Shay, Djibouti the next target of Al-Shabaab, International Institute for Counter Terrorism, IDC Herzliya, April 2021, p. 9.

on July 30. This drone was armed with military-grade explosives, which caused the death of the two crew members.[59]

Figure 13: Tankers attacked off the shore of Oman, BBC

Piracy and Maritime Robbery

The most recent report on global piracy, issued by IMB, lists 68 incidents of piracy and armed robbery against vessels – the lowest number since 1994 – compared with 98 incidents in the same period in 2020. In the first six months of 2021, IMB's Piracy Reporting Centre (PRC) reported 61 cases in which pirates succeeded in boarding vessels, four attempted attacks, two cases of fire being opened against vessels and one vessel hijack.

Despite the overall decline in the number of reported incidents, violence against crews has continued where 50 crew members were kidnapped, three were threatened and taken hostage, two were attacked, one was injured and another killed in the first six months of 2021 (figure 14). Despite the drop in the number of reported incidents, the IMB PRC continues to warn against complacency since in 91% of all reported cases, the pirates succeeded in boarding the vessels.[60]

[59] U.S. Central Command Statement on the Investigation into the Attack on the Motor Tanker Mercer Street, Press Released, Tampa Florida, August 6, 2021.

[60] Piracy and armed robbery incidents at lowest level in 27 years, but risks remain to seafarers, IMB cautions, ICC Commercial Crime Services, July 12, 2021

In the website's map (IMB Piracy & Armed Robbery Map 2021), two cases in the Horn of Africa and Gulf of Oman are marked as attempts by pirates to wrest control of merchant vessels: the first took place on January 24, 2021 when a merchant vessel sailing east of Djibouti noticed a boat with armed men on board equipped with boarding ladders. The ship's crew fired several warning shots, which caused the boat to back off. The second incident occurred near the Straits of Hormuz on March 22, 2021, when the officer on watch on a bulk carrier noticed a boat approaching at high speed. At 40 meters he noticed three armed masked men. The ship contacted the nearby European contingent, which sent a warship to assist. After about twenty minutes, the speed boat backed away. The warship continued to escort the ship until it was out of danger.[61]

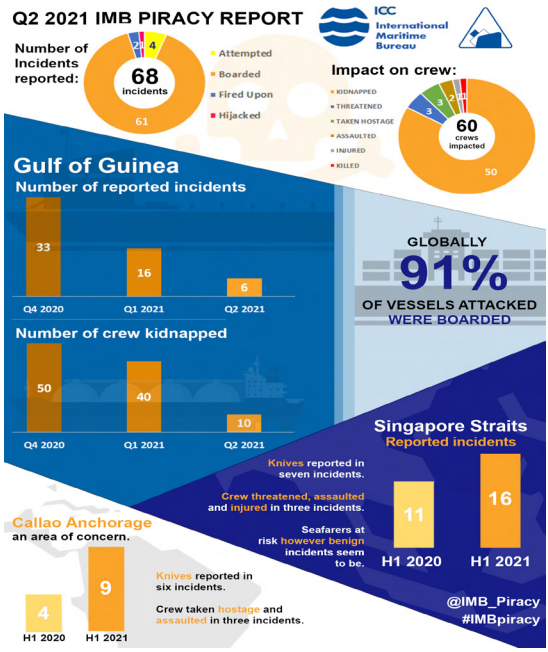

Figure 14: Reported piracy incidents and their distribution

61 IMB Piracy & Armed Robbery Map 2021 [Accessed August 23, 2021].

Main Navies – Trends and changes

We shall turn to review the changes and trends in the world's largest navies compared with the previous report from 2020. We shall focus on the operational arenas, the operation strategy and the Building Navy Force Structure plan of each one of them. In the review of each navy, a special section will be dedicated to its activity in the eastern Mediterranean and the Red Sea – a region which constitutes the main interest of the Maritime Policy & Strategy Research Center.

United States Navy

The United States Navy is undoubtedly the most powerful navy in the world, although in recent years it faces a challenge from the Chinese Navy. Before reviewing the trends and changes of the US Navy, it is worth analyzing the political and defense goals dictated by the new US administration.

At the time of writing this report, the Defense Security Strategy document, signed by the new Defense Secretary – retired General Lloyd Austin – has not yet been released. It should be remembered that only in July 2020 did Dr. Mark Esper, the Secretary of Defense under the Trump administration, issue the ten highlights he perceives in the activity of the Department of Defense.[62]

Austin assumed office in January 2021 and he is the first African-American to hold this position. Austin is a retired general from the United States Army. He has considerable experience with the American army, having filled various roles in Afghanistan and in Iraq, where he participated in the American invasion from Kuwait to Baghdad. In 2010 he assumed the role of Commander of all of the American forces in that country. Three years later he was appointed commander of the American Central Command (CENTCOM) – a role that gave him control over the operations in both Afghanistan and Iraq. Austin retired from the military in 2016.

In his hearing before the senate, Austin promised to publish a new national defense strategy document in 2022, which would update the 2018 version written by the then-defense secretary Jim Mattis. This document was a milestone in the American national defense strategy because it mentioned the United States' defense focus on China, which is becoming a rival power.[63]

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62 US Department of Defense, Implementing the National Defense Strategy: A Year of Successes, July 2020.

63 Paul McLeary, Austin Pledges New National Defense Strategy; Commits To Strong Civilian Leadership, *Breaking Defense*, January 19, 2021.

Upon assuming his position, Austin specified the three highlights and priorities he intended to dictate: national defense, cultivation of the human resources, and successful teamwork. In the national defense, Austin specified defeating the Coronavirus pandemic, prioritization of China as the main challenge the United States must deal with, coping with existing threats (Russia, Iran and North Korea), to revitalize and transform the Pentagon into a more modern organization and to deal with climate change. In cultivating human resources, Austin specified the need to expand the talented manpower in the Pentagon, to build the Department's resiliency and preparedness, to ensure responsible security leadership. Successful team work included strengthening the collaboration with the United States' allies and friends, working together with the American nation, and building unity within DOD.[64]

In July 2021, in a memo issued by the Secretary of Defense, he adds **four main principles for the American space policy**, all urgently needed for improving safety and stability in space: "operating with due regard to others, limiting long-lasting space debris, avoiding harmful interference, and improving the stability of the domain by improving communications (notably, not just with allies)". These four principles are urgently needed to improve the security and stability in space.[65]

The Department of Defense's budget request for 2022 stands at $705,939 billion – a $9,978 billion increase compared with the 2021 budget.[66] In its approval of the budget, the House Appropriations Committee stressed the following issues:

- Safeguarding the United States' national security, safeguarding the United States' advanced manufacturing base, support for jobs and economic growth, investment in research and development
- Closure of the detention facility in Guantanamo, which cancels the budgetary gimmick of overseas covert operations and which restricts the United States' involvement in Yemen
- Advancement of democracy by resisting China and investing efforts in defending the Indo-Pacific region as a free, open region
- Getting Afghan citizens that faithfully served the United States out of Afghanistan safely – citizens that might find themselves in grave danger following the withdrawal of American forces

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64 Terri Moon Cronk, Austin Outlines His Top Three Priorities on Defense, People, Teamwork, *US Department of Defense,* March 5, 2021.

65 Benjamin Silverstein, *What Is the Pentagon's New Guidance on U.S. Space Policy?* Carnegie Endowment for International Peace, July 28, 2021.

66 Appropriations Committee Releases Fiscal Year 2022 Defense Funding Bill, House Committee of Appropriation, June 29, 2021.

- Support for working families by requiring contractors to pay a minimum wage of $15
- Coping with the climate crisis through historic investments in clean energy and adapting climate to protect facilities, readiness and global security
- Dealing with gender violence through allocation of resources for dealing with sexual assault in the military, confronting extremist ideologies including white supremacy.

Some of the issues highlighted mark a new agenda for a democratic administration, although in all matters concerning policy vis-à-vis China – the ultimate goal remains the same.

Budget of the Department of the US Navy for 2022

The Budget of the US Navy for 2022 as submitted to Congress stands at $211.7 billion – a $3.8 billion (1.8%) increase over the 2021 budget. This budget is divided into various issues as follows: operations and maintenance are 34% of the total budget, procurement and manpower are 27% (each) of the total budget, research and development 11%, and infrastructure – 1% (figure 15). The 2022 procurement budget is $2.7 billion smaller than the previous year's budget.[67] According to the Department of the Navy, the budget supports President Biden's interim national defense strategy, is in line with the naval strategy of the joint services and it reflects a common effort to maintain the United States' edge at sea. The Department of the Navy notes that "ultimately, the strength of our Navy is measured by our ability to control the seas and to project power". For this the navy considers as important its ability of forward deployment. The budget provides combat power for the deployment of 296 vessels in the 2022 budget. It is worth noting that according to the original Building Navy Force Structure plan, the navy's order of battle was supposed to be of 310 vessels in order to achieve an order of battle of 355 vessels in 2034 (which was specified in the naval plan for 2020) in order to deter and be decisive in reference scenarios of adversaries such as Russia and China (see figure 16 and table 2). The previous Secretary of the Navy Kenneth J. Braithwaite even attempted, late in the Trump administration, to distribute a strategy document detailing the direction that the Heads of Service (Navy, Marines and Coast Guard) had formed together in order for the service to fulfill its missions.[68] In response to the strategy that was published by

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67 The Department of the Navy's (DoN) Fiscal Year 2022 (FY22) President's Budget submission, America's Navy, Office of Information, March 28, 2021.

68 An integrated U.S. Navy, U.S. Marine Corps, and U.S. Coast Guard team, "Advantage at Sea, Prevailing with Integrated All-Domain Naval Power", December16, 2020.

the Heads of Service, eight consecutive articles appeared in the journal *Maritime Strategy on the Rocks*, which examined various aspects and implications of the naval strategy for the three services that had recently been published.[69]

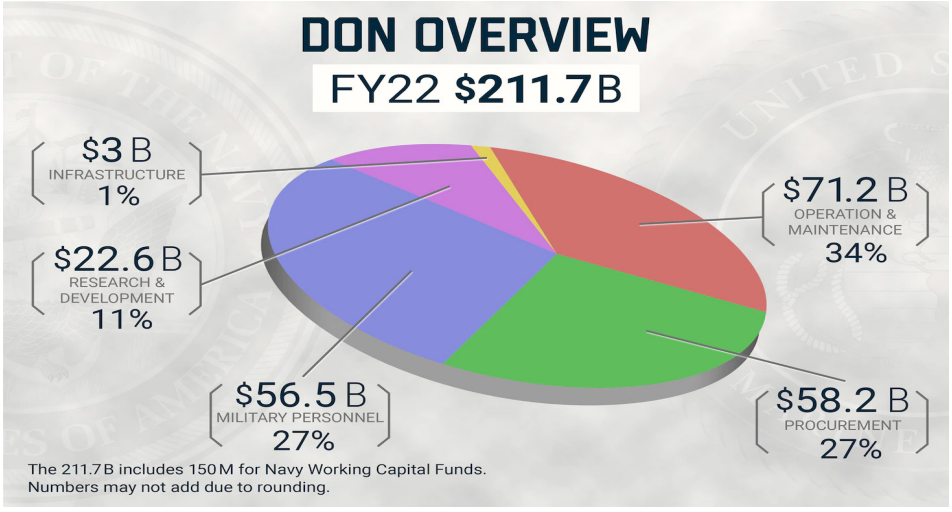

Figure 15: Department of the Navy budget for 2022 as submitted to Congress

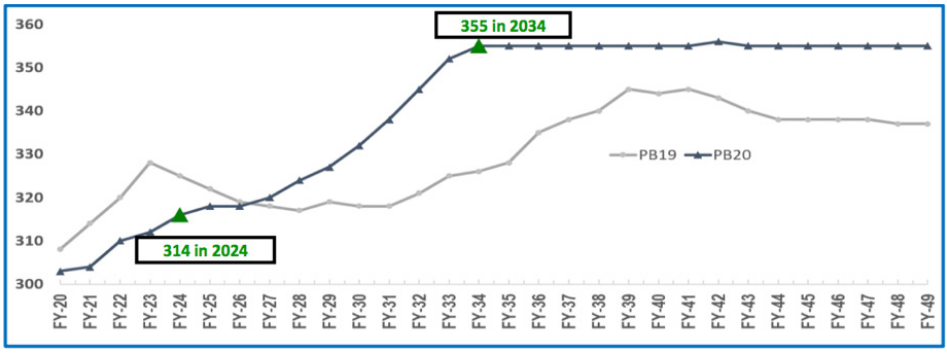

Figure 16: The US Navy's plan to reach 355 vessels by 2034

The commander of the US Navy, Admiral Mike Gilday, commented on this target and said that "we do have an investment strategy that incrementally gets us to a more capable or a more lethal fleet, but not necessarily a bigger fleet, unless we saw a rise in the top line [of the 2022 budget]". Gilday added that "I still think that 355 is a good

69 Jonathan Caverley and Sara Mclaughlin Mitchell, A liberal Case for Sea Power?" *War on the Rock, Commentary*, February 25, 2021.

target, but the reality is that we can't really afford to have a Navy bigger than one that we can sustain [...] **Based on our current budget, I believe the analysis shows that we can afford a fleet of about 300 ships**" (my emphasis, SC).[70]

Table 2: Force building plan according to the 2022 budget vs. the navy target of 355 vessels

Table 6. Projected Force Levels Resulting from FY2022 30-Year Shipbuilding Plan

	CVNs	LSCs	SSCs	SSNs	SSGN/LPSs	SSBNs	AWSs	CLFs	Supt	Total
355-ship goal	12	104	52	66	0	12	38	32	39	355
FY22	11	89	31	51	14	4	31	30	35	296

The budget allows for operation of approximately 11 aircraft carriers and approximately 31 amphibious vessels serving as the base for our leading groups and for amphibious teams. The budget request states, "our budget reflects our resolve to compete, deter, and – if necessary – defeat our rivals, while accelerating the development of a more lethal fleet and having the Navy and Marine Corps generate an integrated all-domain naval power. Only by working as a team and taking care of our people will we be able to defend the nation in the years ahead".[71]

In FY 2022, the combat fleet is supposed to receive 17 vessels: three destroyers, one Zumwalt model destroyer, three nuclear attack submarines (SSN), five littoral combat ships (LCS), an amphibious vessel – a landing platform dock (LPD), a new refueling ship, a ship for expeditionary fast transport (T-EPF) and a tow and towing, salvage and rescue ship for operations in the open ocean (T-ATS). While 17 ships will be added to the order of battle, 14 ships are going to be decommissioned. The Department of the Navy stated that in view of the budgetary constraints, the US Navy downgraded its order of battle in order to enable greater investment in assets that will give it a stronger, more agile and lethal force. Regarding the aerial platforms operated by the US Navy, it will complete the procurement of aircraft from several series, and will finance the operation, maintenance and training for nine naval air wings and three Marine flights.

This means that the US Navy requested a budget that would improve its operational readiness for the short term through investment in the maintenance of ships and

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70 Caitlin Doorknobs', "Navy's top admiral defends ship cuts in proposed 2022 budget, explains strategy", *Stars & Stripes*, July 20, 2021.

71 Fiscal Year 2922 Budget Request, Office of the undersecretary of Defense. (Comptroller)/Chief Financial Officer, Defense Budget Overview, United States Department of Defense, May 2021, p. 119

aircraft, but it reduces the procurement and force buildup, and once again halts the plans to enlarge the Navy. According to a study that was done under previous Secretary of Defense Mike Asper, it was determined that the US Navy has to enlarge its contract for the procurement of nuclear attack submarines from two per year to three submarines, in order to enlarge its attack submarine fleet to 70 submarines. Currently the attack submarine fleet stands at only 50 submarines and the US Navy recently admitted that the industrial base (the two existing shipyards) cannot cope with this capability in their present state. [72]

Another fact worth emphasizing is the decommissioning of the two Littoral Combat Ships *Little Rock* and *Detroit*, which were commissioned in 2016 and 2017, which were developed and built for a specific operational need, but encountered severe realization problems in all matters concerning the drive systems (excessive requirements? S.C.). Despite this, the US Navy will continue operating six littoral combat ships in 2022, four of them in the western Pacific Ocean, and two more in Central and South America.

The budget request for research and development of the US Navy is geared toward greater innovation so as to deliver future capabilities in the short and long timeframes. R&D funding increased by 13% for the Navy and 9% for the Marines in comparison with the 2021 budget, with the development of the advanced prototype components (ACD + P) and development and demonstration of systems (SD&D) accounting for the bulk of the money. Research and development is vital for provision of future technologies that support innovative capabilities in the field of shipbuilding (including Columbia Model submarines), flight (F-35), weapons (Maritime Strike Tomahawk) and experimental technology (conventional rapid attack), unmanned and cyber technology. These technologies are critical to retaining the competitive advantage of the US Navy.

In view of the US Navy's inability to increase its order of battle, the new Secretary of the Navy, Carlos Del Toro, addressed the issue and noted that the US Navy needs to resist requirements creep for their ships in mid-construction, which result in their prices increasing and in particular in the case of the strategic submarines which are the US Navy's number one priority (the Columbia class submarines – SSBN-826). Del Toro stressed that the defense industry also needs to pitch in for the task and hold down costs in the course of the projects. Del Toro noted that these added costs cause the Navy's failure to meet its Building Navy Force Structure goals. He drew attention

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72 Megan Eckstein, "US Navy FY22 budget request prioritizes readiness over procurement", *Defense News*, Budget, May 28. 2021.

to China's competition with the United States all over the world and said that for this reason the United States has to double its efforts in this competition for control over advanced technologies. This past year China has succeeded in adding 22 warships to its order of battle – both surface combatants and submarines – and it has continued to increase its land-based nuclear force. Del Toro also noted China's entry into the field of hypersonic weapons, artificial intelligence and machine learning.[73]

Figure 17: The Independence-variant littoral combat ship USS Gabrielle Giffords

In view of new concept of operations modes with which the US Navy has to contend, particularly regarding littoral warfare, the Navy is committed – in addition to changes in the concept of operations – to define and develop suitable weapons for these challenges. One of these warfare scenarios is the operation of fast, small craft operating in swarm modes in confined water areas such as the Straits of Hormuz. Among the developments that are intended to help the US ships cope with such a scenario is the Optical Dazzling Interdictor, Navy (ODIN) – a laser weapon system that enables the ship to engage unmanned vessels or aircraft. The system belongs to the family of laser-guided energy weapons, including a relatively low-power laser intended to work as a dazzler for blinding using electro-optics and infrared. This can serve to confuse infrared seekers or imaging of incoming weapons, such as anti-ship cruise missiles, diverting them from their course. This can also neutralize cameras used for intelligence gathering purposes, for surveillance and reconnaissance (ISR)

73 John Grady, "SECNAV Del Toro Tells Industry to Hold Down Costs, Resist Requirements Creep," *UNSI NEWS*, August 30, 2021.

on other ships, aircraft and unmanned aerial vehicles (UAV's). In this context, it must be noted that on May 16 2020, the US Navy announced that in a trial carried out on the Navy ship *Portland* (LPD 27), a solid-state laser system with a power rating of approximately 150 kW succeeded in neutralizing a UAV, and that this is one of the new energy weapons the US Navy is developing for warfare in scenarios of this kind.[74]

The effect of the Coronavirus pandemic on the US Navy's activity

On August 9, 2021, the US Secretary of Defense announced in a memo that as of mid-September 2021 the anti-Coronavirus vaccination would become mandatory for all personnel serving in the United States security forces including Navy and marines personnel.[75] Already in March 2021, some 45% of all US Navy personnel had received their first dose of the vaccination, where the estimate was that 70% had responded to the call to get vaccinated. By mid-July 2021, approximately 40,000 Navy personnel had contracted the virus and there were 13 fatalities.

An American task force headed by the aircraft carrier USS *Harry S. Truman* Strike Group, with nearly 5,000 crew members on board, completed a tour in the Indian Ocean and Gulf of Oman between November 2019 and June 2020. and had returned to its home port at Norfolk, Virginia without any one of the crew members having caught the virus. The medical preparations and prophylactic measures taken are described in the military journal *Military Medicine*.[76] This matter is especially noteworthy considering the unscheduled docking of the aircraft carrier USS *Theodore Roosevelt* into Guam in March 2020 in the face of increasing Coronavirus morbidity, the comments made by the Acting Secretary of the US Navy regarding the *Roosevelt's* captain and the public uproar that brought about the captain's resignation and termination of service. The Coronavirus also caused US Navy warships to break seatime records, with the destroyer the *USS Stout* remaining at sea for 208 consecutive days.

US Navy Activity in the Eastern Mediterranean

Ever since President Obama's announcement of his "Pivot to Asia" policy in 2011, the US Navy's activity and involvement in the eastern Mediterranean has been drastically

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74 Ryan White, "How the U.S. Navy can defeat Iran's swarm attacks?", *Naval Post*, May 29, 2021.

75 Secretary of Defense, Message to the Force, Memorandum for all Department of Defense Employees, August 9, 2021.

76 Veronica E. Bigornia, U.S. Navy Aircraft Carrier Prevents Outbreak at Sea in Midst of COVID-19, Military Medicine, 186, 7/8:178, 2021, p. 1.

scaled down, with the Sixth Fleet operating only 14 vessels in August 2021 (table 3).[77] It is also worth noting that since the United States has reduced its dependence on Middle Eastern oil, the geo-economic and geopolitical importance of the region for the USA has diminished considerably.

Table 3: Number of vessels deployed by the United States fleets worldwide

Fleet Forces	3rd Fleet	4th Fleet	5th Fleet	6th Fleet	7th Fleet	Total
1	4	4	22	14	66	111

The Biden administration began defining the main points of its policy toward this region, however it does not seem the administration will make any radical reversals of policies installed in the Obama and Trump days. The State Department recently appointed Richard Norland as its special envoy to Libya, tasked with coordinating with the Government of National Unity (GNU) the stabilizing measures for the situation in Libya and for securing the general elections in December 2021. Nevertheless, at the time of writing, the administration has not yet formed its policy and has not begun engaging with the countries responsible for the instability in the region, primarily – Turkey. Even if the relations between Biden and Erdogan are frostier than they were between Trump and Erdogan, and even if there are occasional flare-ups between the USA and Turkey, these two NATO allies share more important strategic interests (particularly vis-à-vis Russia and China) which could lead to meaningful collaboration in the region.

Since April 2021 Greece and Turkey have been maintaining a political dialog to solve some of their problems. At the same time, this process, which should later be accompanied by negotiations, does not appear promising at the moment. Turkey has announced new demands which the Greek government cannot accede to, such as the demand to demilitarize the eastern Aegean islands, despite the fact that Greece too is a NATO member and makes no territorial claims against Turkey. Failure of the talks could once again ratchet up tensions between the two sides where competing interests in energy, combined with new naval capabilities (especially of the Turkish navy) could result in an environment making a showdown inevitable.[78]

The East Mediterranean Gas Forum (EMGF), which consists of the energy ministers of Egypt, Italy, Israel, Greece, Cyprus, France and the Palestinian Authority (and which to a certain extent is also an axis of resistance to the Turkish moves), held its most

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77 USNI News Fleet and Marine Tracker: Aug 30, 2021, *USNI News*, August 30, 2021

78 Emmanuel Karagiannis, "The Coming Naval Arms Race in the Eastern Mediterranean", *RUSI*, July 22, 2021.

recent ministerial meeting in Cairo on March 9, 2021, where the participation of the United States as an official observer in the forum was approved, after it had been absent from it in previous meetings. The forum's member states decided to establish the forum in September 2020, as an intergovernmental organization seeking to promote the export of natural gas from the eastern Mediterranean.[79] Even though the United States does not use the political dimension of its maritime strategy in the eastern Mediterranean (using naval forces for political ends), it does use other political means in its efforts to retain its status as a world power in the eastern Mediterranean. With this in mind, its joining the forum, albeit as an observer, is of great importance.

The United States and NATO took no operative measures when the Crimean Peninsula was annexed by Russia in 2014. As a consequence, these bodies feel a certain obligation toward the Ukraine – an obligation which is expressed, among other ways, in the number of operations and exercises that NATO forces are holding in the Black Sea region. The United States and Ukraine are holding their annual Sea Breeze exercise along the Black Sea shipping routes. In March 2021, a task force, under the command of *USS Monterey CG 61* saw action, escorted by *USS Thomas Hudner* – DDG 116 – in a routine patrol in collaboration with other NATO forces in the area. The Sixth Fleet spokesman noted that these patrols reflect the United States' support for the national security interests in Europe, the increased cooperation in this arena and it was also a show of presence of the Sixth Fleet. In July 2021, an even larger exercise was held in the Black Sea with participation from 32 navies of NATO member states and Black Sea states – a maneuver that placed the emphasis on the operational collaboration (interoperability). During the exercise, the Russians accused the naval force of transgressing Russian territorial waters, an accusation that was rejected by the commander of the Sixth Fleet.[80]

Against the backdrop of rising tensions in the eastern Mediterranean, the Sixth Fleet and the Israeli Navy conducted a combined maritime security patrol in March 2021, in which the modern Ticonderoga class (CG-61) missile cruiser *USS Monterey – CG 61* and Israeli missile boats model *Saar* 4.5 took part. According to the participants, the joint patrol was intended to "enhance interoperability between the maritime nations

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79 Matthew Sais, The Abraham Accords hold the key to Biden's East Med policy, *Atlantic Council*, April 6 2021.

80 Megan Eckstein, "Six questions with the US Navy's 6th Fleet commander", *Defense News*, August 9, 2021.

through various communication and command and control scenarios between the two navies."[81]

Figure 18: U.S. Navy's deployed carrier strike groups and amphibious ready groups throughout the world as of Aug. 30, 2021 (USNI News)

The Chinese Navy – People's Liberation Army Navy – PLAN

The rising importance of the Chinese maritime interests, of which we have reported in previous situation assessments, has spurred the Chinese navy into further growth in the frequency of its operations, their duration and range beyond the Chinese shores. This activity is consistent with the emphasis placed on action in the maritime domain according to the White Paper the Chinese issued in May 2015, entitled Defense on the High Seas.[82]

The congressional report from August 2021 regarding the modernization in the Chinese navy and its implications for the capabilities of the US Navy, deals with several issues related to the force building in the Chinese navy and its operational strategy:[83] The report emphasizes that the Chinese navy is undoubtedly the largest in East Asia, and in recent years it has surpassed the US Navy in terms of number of warships at its disposal (but not necessarily surpassed qualitatively), a fact that

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81 "U.S., Israeli Navies Conduct Combined Maritime Security Patrols in the Mediterranean", America's Navy News, Office of Information.

82 Blasko j. Dennis, The 2015 Chinese Defense, White Paper on Strategy in Perspective: 14 Maritime Missions Require a Change in the PLA Mindset. *The Jamestown Foundation*, May 29, 2015.

83 China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress, US Congressional Research Service, updated August 3, 2021.

makes the Chinese navy the largest in the world, numerically.[84] The Chinese navy's vessels, aircraft and weapon systems are modern and more highly capable than those of the early 1990s. At present they are comparable, in many aspects, to those of modern western navies. "Chinese naval ship design and material quality is in many cases comparable to USN ships." The report also stated that the "China is quickly closing the gap in any areas of deficiency".[85] In case of an armed conflict between the countries, the Chinese navy is perceived as a significant challenge for the US Navy, and in particular in all matters concerning achieving control in "blue waters" regions in the western Pacific Ocean – a challenge the US Navy has not faced since the end of the Cold War. Accordingly, the report says that China wants its navy to continue to be built so that it will be able to operate with an Anti Access, Area Denial – A2/AD strategy and to deter the United States from intervening in a conflict if and when one should occur in the South China Sea, around Taiwan or in any other scenario, and should it fail to do so, it will delay or diminish the effectiveness of the actions of American forces that will be seeking to intervene in the conflict. In addition, the Chinese navy will be required to secure the Chinese shipping routes, including defending against piracy, evacuation of Chinese citizens from foreign countries when necessary and humanitarian assistance and disaster relief in cases of accidents or natural disasters.

Although the Chinese naval modernization effort has significantly improved its naval capabilities, the current estimate is that the Chinese navy is limited in its capabilities in the following areas: anti-submarine warfare (ASW), long-range target attacks, ability to train a large number of crewmembers for its new ships, command cohesion and lack of combat experience.[86] China is aware of these disparities and is working to close them, or overcome them.

As for China's multi-layered defense concept for its shores – this has been covered in last year's review, pages 65–66.

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84 Alex Hollings, "Just How Big Is China's Navy? Bigger Than You Think," *Sandboxx*, July 28, 2021.

85 Unclassified ONI information paper prepared for Senate Armed Services Committee, subject "UPDATED China: Naval Construction Trends vis-à-vis U.S. Navy Shipbuilding Plans, 2020–2030," February 2020, p. 3. Provided by Senate Armed Services Committee to CRS and CBO on March 4, 2020.

86 The use of a dual command structure in the crews of larger Chinese ships, which consists of a captain and also a political officer, has also been cited as a source of trouble in all matters concerning the effectiveness of the command in certain tactical situations.

Table 4: The various classes of vessels in the Chinese and US Navies since 2005

Year of DOD report	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2020 change from 2005
Ballistic missile submarines	1	1	1	1	2	2	2	2	3	3	4	4	4	4	4	4	+3
Nuclear-powered attack submarines	6	5	5	5	6	6	5	5	5	5	5	5	5	5	6	6	0
Diesel attack submarines	51	50	53	54	54	54	49	48	49	51	53	57	54	47	50	46	-5
Aircraft carriers	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	2	+2
Cruisers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	+1
Destroyers	21	25	25	29	27	25	26	26	23	24	21	23	31	28	33	32	+11
Frigates	43	45	47	45	48	49	53	53	52	49	52	52	56	51	54	49	+6
Corvettes	0	0	0	0	0	0	0	0	0	8	15	23	23	28	42	49	+49
Missile-armed coastal patrol craft	51	45	41	45	70	85	86	86	85	85	86	86	88	86	86	86	+35
Amphibious ships: LSTs and LPDs	20	25	25	26	27	27	27	28	29	29	29	30	34	33	37	37	+17
Amphibious ships: LSMs	23	25	25	28	28	28	28	23	26	28	28	22	21	23	22	21	-2
Total of types above (*does not include other types, such as auxiliary and support ships*)	**216**	**221**	**222**	**233**	**262**	**276**	**276**	**271**	**273**	**283**	**294**	**303**	**317**	**306**	**335**	**333**	**+117**
China Coast Guard ships	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*185*	*240*	*248*	*255*	*n/a*
Total U.S. Navy battle force ships (which includes auxiliary and support ships but excludes patrol craft)	291	282	281	279	282	285	288	284	287	285	289	271	275	279	286	296	+5
Total U.S. Navy battle force ships compared to above total for certain Chinese ship types	+75	+61	+59	+46	+20	+9	+12	+13	+14	+2	-5	-32	-42	-27	-49	-37	-112

Source: Table prepared by CRS based on 2005-2019 editions of annual DOD report to Congress on military and security developments involving China (known for 2009 and prior editions as the report on China military power), and (for U.S. Navy ships) U.S. Navy data as presented in CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

Notes: n/a means data not available in report. **LST** means tank landing ship; **LPD** means transport dock ship; **LSM** means medium landing ship. The DOD report generally covers events of the prior calendar year. Thus, the 2019 edition covers events during 2018, and so on for earlier years. Similarly, for the U.S. Navy figures, the 2019 column shows the figure for the end of FY2018, and so on for earlier years.

Table 4 presents the quantitative advantage the Chinese navy has over the US Navy, although this does not reflect the qualitative advantage of the American order of battle in almost every area.

In addition to modernization of the Chinese navy, China has scaled up its coast guard quite substantially in recent years. China's coast guard is undoubtedly the largest of all East Asia countries. China also operates a large naval militia that consists of a large number of fishing vessels, as witnessed at the start of the dispute over the Exclusive Economic Zone with the Philippines. China relies primarily on the naval militia and its coast guard to claim and defend its maritime claims in the waters near its shores, where the navy operates on the horizon as a potential backup force.

The Force Building Plan of the Chinese Navy

This part of the report provides a brief review of the components of the development and modernization efforts being made in recent years in the Chinese navy. There are no precise data regarding the Chinese navy's budget and it is also evident that within China's defense spending, there is a difference between the numbers quoted by the Chinese government and those estimated by the Stockholm International Peace Research Institute – SIPRI. Whatever the case may be, the impression is that over

the course of the second decade of the 21st century, China's defense spending is in a continual upward trajectory (see figure 19).

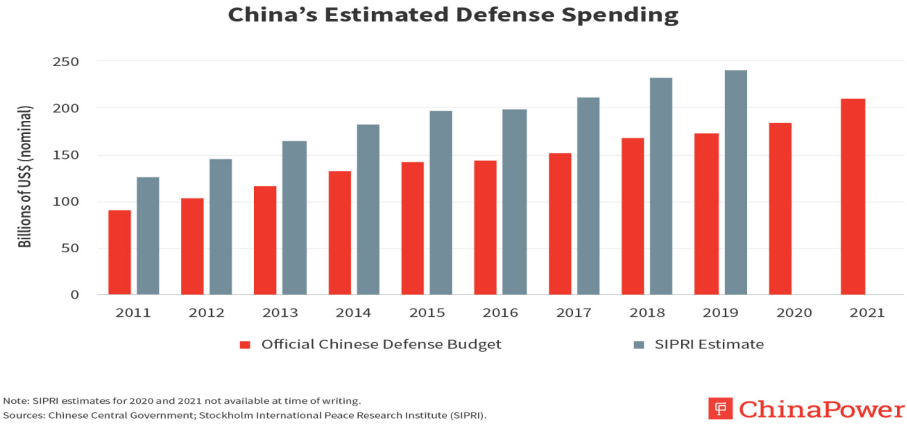

Figure 19: China's estimated defense spending

Anti-surface combatant missiles

China operates two kinds of land-based ballistic missiles capable of hitting vessels: DF-21D, an anti-ship ballistic missile (ASBM) with a range of approximately 1,500 km (meaning more than 910 nautical miles), and an intermediate range ballistic missile DF-26 (IRBM), road-transportable, with a maximum range of 4,000 km (2,160 nautical miles). A Pentagon report notes that it is capable of precision conventional and nuclear targeting of land-based targets as well as conventional attacks against marine targets. A newspaper report from November 2020 said that in August 2020 a successful trial was carried out on two types of missiles against moving targets in the South China Sea. The missiles hit the target vessel, which was cruising south of the Paracel Islands.[87] At the end of 2020, Admiral Philip Davidson, commander of the Indo-Pacific Command, for the first time acknowledged that the Chinese had successfully concluded a test launch of an anti-ship ballistic missile and that China was also developing Hypersonic Glide Vehicles which, when integrated in missiles, will make them very difficult to intercept. Such missiles, when integrated with Naval Command & Control systems, will enable China to attack aircraft carriers and other US Navy ships operating in the Pacific Ocean. The US Navy has not encountered

87 Andrew Erickson, "China's DF-21D and DF-26B ASBMs: Is the U.S. Military Ready?" *Real Clear Defense*, November 16, 2020.

precision ballistic threats with good penetration chances in the past, and they also note that this weapon is a "game changer weapon".[88]

China also possesses a very large stockpile of anti-ship cruise missiles (ASCM) of Russian and Chinese manufacturing, including several advanced, high-capability models such as the Chinese YJ-18. The relatively long ranges of the Chinese cruise missiles are a cause for concern for the American Navy in all matters related to the superiority of the American marine cruise missiles in different parameters, such as for example their range.[89]

Most of the submarines in the Chinese submarine fleet are attack Diesel-electric submarines (SSS), non-nuclear driven. However, China operates a small number of nuclear drive (SSN) attack submarines and a smaller number of nuclear-driven ballistic missile submarines (SSBN). It is assumed that the number of nuclear attack submarines (SSNs) and ballistic submarines (SSBNs) will increase in the coming years (table 5).

Table 5: Numbers of Chinese and US Navy Battle Force Ships, 2000–2030

	2000	2005	2010	2015	2020	2025	2030
Ballistic missile submarines	1	1	3	4	4	6	8
Nuclear-powered attack submarines	5	4	5	6	7	10	13
Diesel attack submarines	56	56	48	53	55	55	55
Aircraft carriers, cruisers, destroyers	19	25	25	26	43	55	65
Frigates, corvettes	38	43	50	74	102	120	135
Total China navy battle force ships, including types not shown above	**110**	**220**	**220**	**255**	**360**	**400**	**425**
Total U.S. Navy battle force ships	***318***	***282***	***288***	***271***	***297***	***n/a***	***n/a***

Source: Table prepared by CRS. Source for China's navy: Unclassified ONI information paper prepared for Senate Armed Services Committee, subject "UPDATED China: Naval Construction Trends vis-à-vis U.S. Navy Shipbuilding Plans, 2020-2030," February 2020, 4 pp. Provided by Senate Armed Services Committee to CRS and CBO on March 4, 2020, and used in this CRS report with the committee's permission. Figures are for end of calendar year. Source for figures for U.S. Navy: U.S. Navy data; figures are for end of fiscal year.

Note: "n/a" means not available.

China today has two aircraft carriers, from whose decks fixed-wing aircraft are deployed. On takeoff they are assisted by a ski ramp. The last of the two (the *Shandong*) was commissioned for active duty in the summer of 2021.[90] By the end of

88 Christian Davenport, "Why the Pentagon Fears the U.S. Is Losing the Hypersonic Arms Race with Russia and China," *Washington Post*, June 8, 2018.

89 Dennis M. Gormley, Andrew S. Erickson, and Jingdong Yuan, A Low-Visibility Force Multiplier, Assessing China's Cruise Missile Ambitions, Published by National Defense University Press for the Center for the Study of Chinese Military Affairs, Institute for National Strategic Studies, Washington, D.C., 2014.

90 Minnie Chan, "China's Shandong Aircraft Carrier Ready for High Seas Test, Insider Says," *South China Morning Post*, April 8, 2021.

the decade, the Chinese are expected to complete the construction of their fourth aircraft carrier, which will be similar in size to the American aircraft carriers and will be equipped with braking mechanisms (catapults). All the Chinese aircraft carriers are conventionally powered. Despite their importance, experts believe these aircraft carriers will not be the main force builder in case of military action against Taiwan, because Taiwan's proximity to mainland China enables the use of Chinese air power from Chinese land bases.

China's Activity in the Middle East

China is continuing to deepen its involvement in the Middle East and in the east Mediterranean, using its "bulging wallet" to secure influence over primary allies in the region as a means for advancing its global aspirations. Even as the United States disengages from the Middle East, there are those in the American foreign policy community that believe the area will be among the places where a great power rivalry will unfold between Washington and Beijing. These analysts point out that China's investment in the region, its bidirectional trade with regional powers, its military base in Djibouti and its strengthening ties with Iran will transform China into a formidable adversary of the United States in the region.[91] The marine base in Djibouti, which was officially opened in 2017, was originally developed to support China's anti-piracy mission off the Somalian coast in the Gulf of Aden, but has expanded over time and now includes capabilities which can serve as a logistical supply base for its blue-water fleet, such as its large new class 075 amphibious warship or the aircraft carriers it has begun using.[92] Nowadays China is the main buyer of oil in the Middle East since 72% of all the oil consumed in China comes from imports. Since oil consumption in the rest of the world is in decline and is set to diminish even further, China's oil imports are increasing in importance for the Middle Eastern oil producers, meaning that China's geopolitical importance is rapidly growing.

China has already developed comprehensive strategic partnerships with Saudi Arabia, Egypt and the United Arab Emirates, while its influence in Iran has grown considerably following the signing of a 25-year cooperation program with Tehran.[93]

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91 Steven A. Cook and James Green, "China Isn't Trying to Dominate the Middle East But U.S. Retrenchment Might Allow It To", *Foreign Affairs*, August 9, 2021.

92 Vinayak Bhat, "Construction fast-tracked at China PLA's first overseas base in Djibouti", India Today, October 30, 2020.

93 "China challenges US position as most important partner for Middle East, Business Standard", *Business Standard,* June 14, 2021.

Chinese foreign minister Wang Yi visited Syria, Egypt and Algeria in July 2021 and met with senior officials of the Arab League. This was Wang's second visit to the Middle East this year, following his visit in March to six countries: Saudi Arabia, United Arab Emirates, Oman, Bahrain, Iran and Turkey. In addition to trade issues, the visits dealt with three other major issues: promoting the distribution of the Chinese vaccines for COVID-19, Chinese investments as part of the "Belt and Road initiative" and the Israel-Palestinian conflict. China tends to raise the latter issue in various international forums and in meetings with Arab leaders. Chinese declarations show that it regards the Palestinian issue to be at the heart of the troubles in the Middle East, and that sustainable peace and security in the region depends on solving this problem. Accordingly, the issue was mentioned in all the minister's meetings and action plans were even introduced in two of them. In Saudi Arabia in March, Wang introduced a five-point plan for achieving peace and security in the Middle East. The Chinese Foreign Minister said that China intends to raise this lingering dispute in the UN Security Council, to support the two-state solution and to invite peace activists from both sides for talks. In his visit to Egypt in July, he raised three ideas for achieving the two-state solution: improving the stature of the Palestinian Authority, supporting unity between the Palestinian factions and encouraging the renewal of the peace talks based on the two-state solution. Unfortunately, these trends in the Chinese foreign policy in the Middle East were only belatedly understood by Israeli decision-makers despite the fact that position papers had been issued in recent years by the Maritime Policy & Strategy Research Center at the University of Haifa.[94]

In March 2021, China and Iran signed an agreement which, according to their Foreign Ministers, is intended to facilitate a strategic partnership that should last over the next quarter-century. The details have not yet been made public although the assumption is that China, in contravention of American sanctions, will buy oil from Iran and will invest heavily in development of the energy infrastructures in Iran. No doubt the sanctions have "starved" Iran of foreign investment, and the economic horizon China offers it will provide it with desperately needed breathing space. On the Chinese side, this most recent extension of China's huge infrastructure project – the Belt and Road Project – forges the ties Beijing needs to continue its expansion as a global power.[95]

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94 Shaul Chorev, "Summary of the Strategic Evaluation and Policy Recommendations", Maritime Strategic Evaluation for Israel 2018/19, p. 293.

95 Jeremy Bowen, "China sets sights on Middle East with Iran co-operation deal", *BBC News*, March 31, 2021.

During August 2021, during the evacuation of the American and NATO forces from Afghanistan, the Russian ambassador to Tehran Levan Dzagaryan, announced that Russia, Iran and China would be holding joint marine exercises in the Persian Gulf in late 2021 or early 2022. The exercises will be carried out with military vessels from the three countries taking part and will focus on securing navigation and fighting piracy.[96] The announcement of the joint exercise came after a joint declaration by the United States, the United Kingdom and Israel that accused Iran of a drone attack on the *Mercer Street* oil tanker on July 29, 2021, threatening that this attack would have its implications.

On September 1 2021, the Haifa Bayport Terminal (Namal HaMifratz) was inaugurated. It is operated by the Chinese SIPG (Shanghai International Port Group) Company and will operate container ship loading and unloading. The port was inaugurated after 15 years of planning and construction. This is one of the largest infrastructure projects ever undertaken in Israel. It involved investment of over 5.5 billion Shekels in infrastructure and operating equipment. The port covers an area of 840 Dunams (230 acres) in the sea and was opened for business after being six years in construction. The US government has in the past expressed its concern over the construction of vital infrastructures in Israel by Chinese companies, let alone operating them, and this cannot be disregarded. Then Secretary of State Mike Pompeo even traveled to Israel in May 2020 to warn the then-Prime Minister Benjamin Netanyahu against the win, by the Chinese Hutchinson Company, of a tender for the construction of the Sorek 2 desalination plant. The message was heard loud and clear in Jerusalem and the Joint Committee of the Ministries of Finance and Energy and the Water Authority awarded the concession to a consortium of the IDE desalination company and Bank Leumi.

This year there was no sailing of Chinese navy ships into the Mediterranean, nor were there any Chinese maneuvers there. However, some researchers claim that China is using the global supply chain as a highly efficient weapon system, enabling it to control a different dimension of the maritime domain without having to resort to its combat fleet.[97]

The Russian Navy

Despite its economic situation, Russia continues sending out messages of its intention to safeguard the Russian navy's status as one of the world's most powerful

96 "Russia, Iran and China to hold joint drills in Gulf -RIA", *Reuters World*, August 23, 2021

97 Christopher R. O'Dea, "How China Weaponized the Global Supply Chain", *National Review*, June 20, 2019.

and equipped with highly advanced weaponry. This was expressed, among other places, in President Putin's speech on the Russian Navy Day held on July 25, 2021.[98]

Over the past year, the Russian navy has increased its activity in the Arctic region, expanded its presence in Africa and the Middle East, and has consistently challenged NATO activity throughout Europe. It is estimated that the Russian navy nowadays has approximately 360 ships of all classes in service. The large ships continue to be replaced with smaller ships such as corvettes and frigates. Corvettes of the Karakurt and Stereguschiy models are intended to support the larger frigates, which are equipped with guided cruise missiles of the Admiral Gorshkov and Admiral Grigorovich models. Many of these ships are smaller in size and armament than those in NATO service, however new technology and weapons, in particular Model Kalibr cruise missiles, which were put into service in 2015, compensate for these disadvantages. These cruise missiles, which can be both submarine-borne and ship-borne – ships that operate in the Caspian Sea. They are capable of hitting targets throughout Europe and the Middle East. The Russian submarine force currently consists of 59 submarines, including 12 nuclear ballistic missile submarines (SSBN) and nine attack submarines (SSGN). Russian strategists regard the Russian submarine fleet to be the main attack force capable of defeating the United States Navy. The four Borei Model ballistic submarines and the one Yasen Model attack submarine are supposed to replace the old models currently in the order of battle. [99]

Since the start of the most recent wave of reforms in the Russian armed forces in 2009, the Russian leadership is sending the message that the Russian navy's crisis period was over, and that it is returning to its past glory, and is capable of undertaking missions befitting a superpower's navy. On Navy Day, which was marked on July 25, 2021, President Putin said that "We will continue to boost the potential of the Russian navy, develop its bases and infrastructure, arm it with state-of-the-art weapons", and that "A strong and sovereign Russia needs a powerful and well-balanced navy".[100] Putin also announced that Russia had begun a process of construction of two nuclear-powered submarines, armed with intercontinental ballistic missiles, two Diesel-powered submarines and two corvettes, which will be

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98 Alexander Nicholson. "Putin Touts Russia's Hypersonic Nuclear Weapons at Naval Parade", *Bloomberg*, July 25, 2021.

99 Benjamin Brimelow, "Russia's Navy is making a big bet on new, smaller warships loaded with missiles", *Insider*, April 1, 2021.

100 Vladimir Isachenkov, "Putin launches construction of new nuclear subs and warships", *The Associated Press, DefenseNews*, August 23, 2021.

built at the Severodvinsk Shipyards in St. Petersburg and the Komsomolsk-on-Amur Shipyards.

Russia has prioritized its military modernization path, which is gaining top priority, because its relations with the West have recently hit a new low following the annexation of the Crimean Peninsula in 2014. Russia is trying to recover its permanent naval presence in parts of the world in which the Soviet Union had such presence during the Cold War. The Russian navy already has a permanent presence in the Mediterranean, which among other things relies on the naval base in the Port of Tartus in Syria, which Russia has enlarged and which is actually the only facility Russia has beyond its own territory.[101]

Looking ahead, in its current force-building drive, the Russian navy is not expected to reach the size of the Soviet navy in the late 1970s, however recent developments show that the navy is upgrading its capabilities and that it will not be the ramshackle fleet it was in the 1990s following the collapse of the Soviet Union.

The Russian Navy's Force-Building Plan

The Russian navy benefitted from a larger budget in 2020 than the other military branches. This fact enabled it to develop and build new ships and submarines and to develop precision attack capabilities after years of restricted budgets. By the end of 2021, Russia will be bringing six new submarines into service – three of them nuclear-powered, the (world's largest) battleship – the nuclear-powered Model Kirov and christened *Admiral Nakhimov*. Russia also plans to begin the sea trials of its only aircraft carrier, the *Admiral Kuznetsov* by the end of 2022. The *Kuznetsov* has been under repair since it was damaged in 2020 in a fire caused by welding works, which killed two shipyard workers and injured 14 others.[102] The Russian shipyards prefer to build smaller ships with greater fire power, which mostly can be modified modularly, or for multi-purpose combat, enabling them to be used flexibly. Additionally, the Russian navy has focused on developing weapon systems with longer ranges and greater accuracy. This being said, it is worth noting that most of the large Surface combatants in the Russian navy are more than 30 years old. They occasionally undergo various renovations to extend their service life since the Russian shipyards have difficulty in building ships with a draft exceeding 7,000 tons.

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101 See the annual situation assessment 2020/21 – the chapter by Ido Gilad, "Russian Navy - Major trends in 2020 and Their Implications for the Middle East", pp. 112–127.

102 Benjamin Brimelow, "Russia's Navy is making a big bet on new, smaller warships loaded with missiles". *Business Insider*, April 4, 2021.

As a result, Russia relies more and more on heavily-armed frigates for its surface warfare. These ships are equipped with vertical launch systems for Kalibr-model cruise missiles, anti-submarine missiles and Zirkon-model hypersonic anti-ship missiles (capable of achieving 8 MACH and still in its trial stages). However, and despite the considerable resources invested on this, Russian industry, ever since its disengagement from Ukraine in 2014, is having difficulties setting up the industrial base for the engines of its cruise missiles. The Russian submarine fleet is continuing to grow and Russian industry is making progress in its manufacturing capabilities and in building up its new capabilities – for the nuclear-powered ballistic submarine fleet, for the submarines armed with cruise missiles, and for its conventional attack submarines.[103]

In the reports by the Maritime Policy and Strategy Research Center in 2019 and 2020, we wrote about the progress made in the development of a new Russian Poseidon torpedo, which is the largest torpedo ever developed by any country. This is an autonomous nuclear-powered torpedo, armed with a nuclear warhead (possibly a 2-megaton warhead). The torpedo has a diameter of approximately 2 meters and is over 20 meters in length, making it 30 times larger than a regular torpedo. It is intended to destroy potential enemy naval bases and to become part of the Russian nuclear deterrent. The torpedo, which is intended to carry a nuclear warhead and a conventional warhead, is expected to enter into service in 2027 and to be launched from the new K-329 Belgorod submarine. As of the writing of this report, the Russian navy is continuing to develop the torpedo. Images taken from the Maxar satellite in August 2021 confirm the presence of a special trial ship, the *Akademik Aleksandrov*, which is intended to serve as the trial and launch platform of the Poseidon, during the stage preceding the conducting of submarine trials. The ship was located in a base in the Dvina River estuary on the White Sea. Work on the new dock began in 2018 and a substantial part was completed in 2020. The trial ship was spotted there in July-August. Not far from this site is the Severodvinsk site. This is where many of Russia's most advanced submarines are built and it is already closely linked with Poseidon. The ships and submarines taking part in the preliminary trials are already at this base. The *Sarov B-90* submarine, which was launched in 2007, will apparently be performing the trials of the Poseidon nuclear-headed torpedo (see Figure 20).[104]

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103 "Russian Armed Forces: Capabilities, Navy", *In Focus, Congressional Research Service*, June 30, 2020, p. 2.

104 H. I. Sutton, "New Satellite Images Hint How Russian Navy Could Use Massive Nuclear Torpedoes", *USNI News*, August 31, 2021.

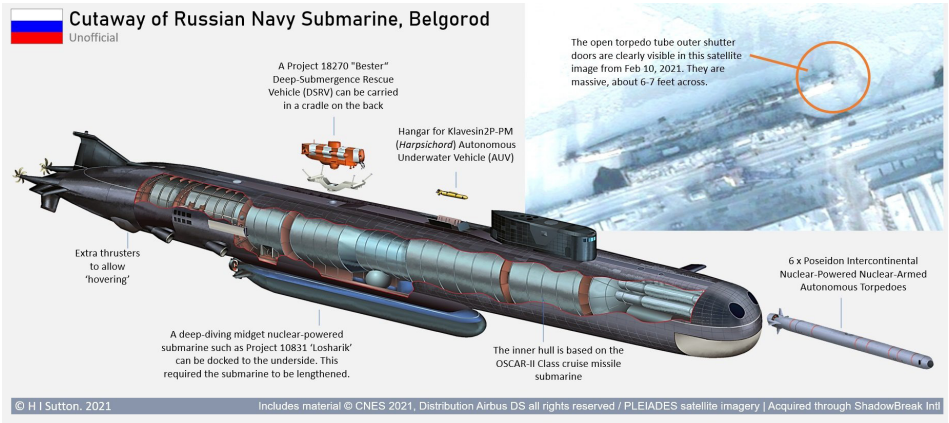
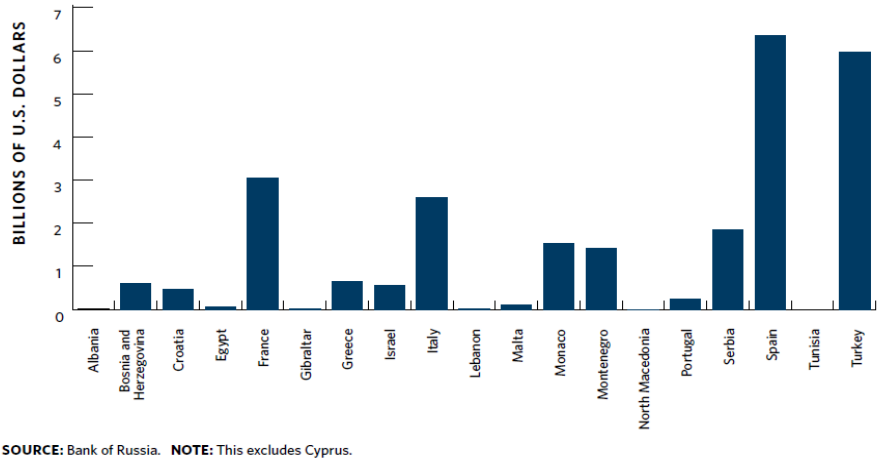


Figure 20: Cutaway of the Russian Belgorod Submarine that is supposed to carry out the trials on the new torpedo

Russian Navy Activity in the Eastern Mediterranean and Black Sea and its Operational Doctrine

Russia's strategy in the Mediterranean forms an integral part of the broader strategy applicable to the European arena, which has been identified by the Russian political echelon as the main arena in which its foreign policy's victories and obstacles will be played out. Europe's dominant position in the Russian foreign policy agenda is an outcome of its strategic culture, which is shaped by geography, historical heritage, and its worldview which views the West as a threat to Russia's internal political order. A recent Carnegie Endowment report notes that it is impossible to understand Russia's current posture in the Mediterranean without viewing it in a broader context and against the background of its long-time involvement in the region, including during the Cold War. Russia's posture in the Mediterranean is largely intended to safeguard its accomplishments in Syria and to defend Russia against the aerial and maritime threats against its territory its leaders perceive from NATO. They try to achieve this through an Anti Access/Area Denial (A2/AD) strategy, inter alia from its bases in Syria. It is possible that Russia's long-term aim is to dominate the Mediterranean, although under the current circumstances they make do with denying NATO possible courses of action and to an extent to supplant the United States/NATO as a mediating, power-wielding force in the region.[105]

[105] Eugen Rumer, Richard Sokolsky, "Russia in the Mediterranean: Here to Stay", Carnegie Endowment for International Peace, May 2021.https://carnegieendowment.org/files/Rumer_Sokolsky_Russia_in_the_Med_Updated.pdf [Accessed September 7, 2021]



SOURCE: Bank of Russia. **NOTE:** This excludes Cyprus.

Figure 21: Russia's direct investments in Mediterranean states (excluding Cyprus) in 2020

The Russian navy in the eastern Mediterranean is based primarily on the Black Sea fleet, ranging in size between 8 and 15 ships of different kinds. The Russians make sure they conduct one exercise per year in the eastern Mediterranean as a minimum. The Russian bases in Syria extend the Black Sea fleet's capabilities in the eastern Mediterranean: recently Russia has scaled up the infrastructures of its air base in Khmeimim to accommodate heavy bombers and has even built a new runway. The Russians held large-scale maneuvers in the eastern Mediterranean in mid-June 2021 involving several warships, two submarines and long-range Tupolev-class bombers (Tu-22M3) along with other fighter aircraft. The supersonic Tu-22M3 aircraft, capable of carrying nuclear weapons, have first been deployed in Syria as a show of increasing Russian military muscle in the eastern Mediterranean. In the course of combat activity of the new British aircraft carrier *HMS Queen Elizabeth* in the Eastern Mediterranean (before it continued on its voyage to the Indian Ocean, F-35 aircraft were sent from it for attack missions against Islamic State (ISIS) targets in Syria. Armed Russian aircraft tracked the activities of the British task force.

A naval force, based primarily on NATO countries (but not only), conducted a maritime exercise named Sea Breeze 2021 in June and July 2021, which involved thirty-two countries. The exercise was conducted under United States Navy and Ukraine navy leadership. 5,000 soldiers, 32 ships, 40 aircraft and 18 special forces participated in the exercise. Tensions escalated between Russia and a British-American force which did a show of the flag patrol in the Black Sea. The Russians deployed to the Khmeimim air base a squadron of MiG 31 aircraft armed with Kinzhal hypersonic missiles that have a range of approximately 2,000 km. The Russians claimed that one

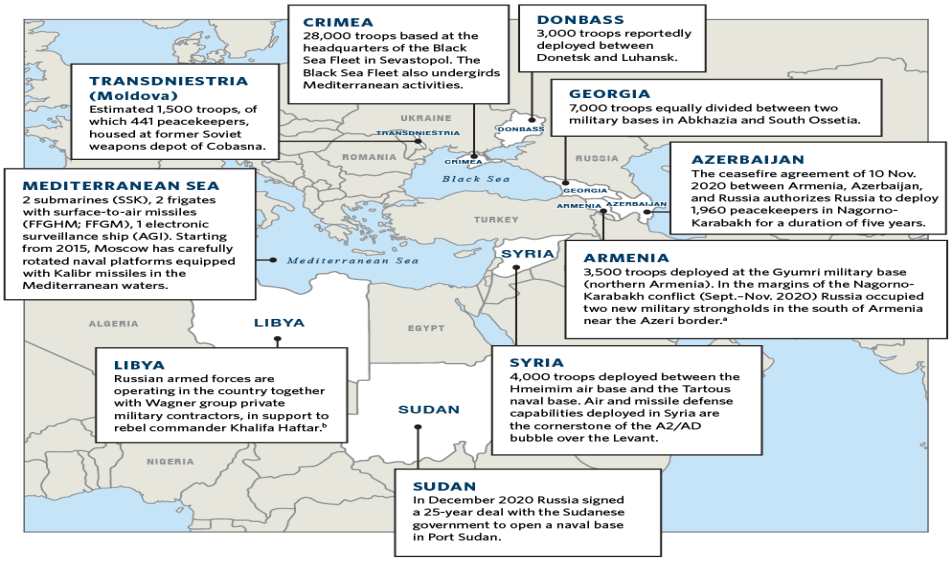
of its warships fired warning shots on June 23 and a fighter aircraft dropped bombs near the British destroyer *HMS Defender* to force it to exit a zone near the Crimean Peninsula which Russia claims is part of its territorial waters. [106]

Figure 22: Division of the offshore territories in the Crimean Peninsula region

Before the exercise got underway, the destroyer concluded a visit to the Port of Odessa in Ukraine and was en route for a similar visit to the Port of Batumi in Georgia but the question arising from this incident is: why did the Royal Navy decide to sail close to the Crimean Peninsula coast? Russia, as we know, has claimed the Crimean territorial waters as its own ever since it annexed the peninsula in 2014, however the West, including Britain, does not recognize the annexation and therefore as far as they are concerned these waters belong to the Ukraine. Moreover, maritime law states that ships have the right to cross the territorial waters of another country using the right of innocent passage. In the past Russia has already recognized that this right stands both for merchant ships and for warships and, in fact, the Russian navy ships usually pass through British waters in the English Channel, exercising

[106] Vladimir Isachenkov, "Russia launches Mediterranean drills amid rift with Britain", *AP News*, June 25, 2021.

their right of innocent passage. Western experts claim that the difference between Russia's bellicose public allegations concerning the passage and its actual response to the passage of the British destroyer highlight both Russia's caution regarding potential military conflict with NATO and recognition of the limits of its capabilities. [107] Russia expressed its dissatisfaction with the recent exercises the Americans and NATO initiated in the Black Sea and instructed its forces to conduct a simulation of an attack exercise in a scenario where enemy vessels penetrate its maritime waters using a strategy of area denial, where all this was done to emphasize that the area comes under the Russian sphere of influence. [108]



a https://www.reuters.com/world/russian-military-armenia-reinforce-areas-near-azeri-border-agencies-2021-05-03/, last accessed May 27, 2021.
b https://www.africom.mil/pressrelease/32887/russia-deploys-military-fighter-aircraft-to-l, last accessed May 27, 2021.

NOTE: Unless otherwise indicated, all figures are taken from IISS Military Balance 2021.

Figure 23: Russia's presence in and around the eastern Mediterranean Basin

Part of the Russian strategy in the Mediterranean is driven by the need to gain a foothold in countries where new energy developments are taking place. In Egypt, Russia bought 30% of the offshore gas field Zohar from the Italian Eni company. This is a central gas extraction field in the eastern Mediterranean, and in Libya, Russia is

107 Dmitry Gorenburg, "The HMS Defender Incident: What happened and What Are the Political Ramifications?" *Russia Matter*, July 1, 2021.

108 Abraham Mahshie, "Russia Simulates Bombing Exercise in Black Sea as NATO, US Forces Exercise", *Air Force Magazine*, July 6, 2021.

taking a major gamble for the possibility of acquiring concessions. Russia's recent military support for the forces of General Khalifa Haftar in the east and south of the country, and the red line from Sirte to Al Jufrah, which was drawn by the Russian expeditionary force to Libya in 2020 have an energy dimension which is no less important than its strategic dimension.

As for a Russian toehold in the Red Sea, the Trump administration exerted political and economic pressure on Sudan not to sign off on rights of anchorage for Russian warships in Port Sudan. Following these pressures, Sudan's Foreign Minister Mariam al-Mahdi, announced that Russia's proposal from 2020 to build a Russian port at Port Sudan was under consideration by the legal authorities in the country, putting a temporary stop to the Russian initiative that made headlines in 2020.

Finally, as stated in the previous year's Maritime Strategic Evaluation for Israel, the Mediterranean will continue to play a key role in the Russian navy's strategy due to its strategic importance as an access point to South Europe, the Middle East and North Africa. As far as Russia is concerned, the Mediterranean embodies the greatest rivalry between Moscow and Washington. By building up its naval forces, Russia hopes to deny NATO access to the region, to defend Russia's southern flank, and to assist as a patron of its present and potential client states in the region. The upkeep of a naval presence in the Mediterranean is a more effective strategy for the Russian navy than the attempt to compete with the US Navy on the high seas ("blue waters") since Russia has neither the resources not the global ambition to challenge American supremacy around the world, nor the ability to compete against the US Navy in traditional power projection missions. Yet, its ambition, which is also a holdover from the Soviet period, to continue with its status projection in the region will persist, through port visits, regular exercises to project the image of a superpower. At the same time, the enlargement of the Mediterranean fleet (as part of the Black Sea fleet) is a limited, attainable target, even if it closely dovetails with the goals of the Russian foreign policy in the region.

The North Atlantic Treaty Organization (NATO) Forces

The transition of power in the United States has brought with it a strengthening of its commitment toward the NATO countries – a fact that was expressed in the first meeting between the Secretary of Defense, retired General Lloyd Austin, and the NATO Secretary General. Austin stressed the United States' belief that NATO is the substantial forum underpinning trans-Atlantic security and reaffirmed strong support for the NATO 2030 initiative of Secretary General Jens Stoltenberg, which

is intended to keep the treaty militarily strong, to strengthen it politically and to provide it with a more global status.[109]

As part of the Qatar Agreement with the Afghan Taliban, the United States and its NATO allies agreed to withdraw from Afghanistan in exchange for a Taliban promise not to allow al Qaeda or any other extremist group to operate from areas under its control. During 2021, the number of NATO soldiers in Afghanistan was reduced from 100,000 to 10,000, the latter all being evacuated in a humiliating, hasty retreat before the end of August 2021. At the time this chapter is being written, it seems the effects of this withdrawal on NATO's naval forces is very limited.

The European Union's Naval Strategy is out of date and according to the plan, by March 2022 the European Union is expected to present its compass for security and defense, which should provide a clearer guideline as to what kind of "maritime player" the EU wishes to be. This is a challenging task, especially when there is limited political agreement as to the maritime security role of the EU, and there is uncertainty as to how far it ought to operate geographically, while there are immediate threats closer to home. In an article by Daniel Fiott, editor of the journal of the European Union Institute for Security Studies (EUISS), he notes that "The EU and its member states will find it increasingly difficult to sustain the rules-based order and the Union's own economic prosperity without a sizeable and consistent investment in maritime power". In his opinion, "The politics of the EU's approach to maritime security is conditioned by questions of geographical priorities and how to balance 'soft' and 'hard' maritime risks", and that "The Strategic Compass should set measurable targets that lead to a higher and more credible EU naval presence, and it may even instigate a shift in the way the EU thinks about maritime security more broadly".[110]

The activity of the NATO forces in the Mediterranean included Operation Sea Guardian, which is supposed to cover the entire range of NATO's maritime security (MSO). As of now, the operation has three secondary missions: building maritime security capabilities, supporting maritime situation awareness and combatting maritime terrorism. A secondary operation was included as part of the operation, named Sophia Operation. This is a European Union operation regarding information sharing, logistical support and implementation of Resolution 2357 of the UN Security

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109 John F. Kirby, "Readout of Secretary of Defense Lloyd Austin's Meeting With NATO Secretary General Jens Stoltenberg". *US Department of Defense Release*, June 7, 2021.

110 Daniel Fiott, "Naval Gazing, The Strategic Compass and the EU's maritime presence", *Brief*, 16, July 2021, p. 1.

Council (the arms embargo on Libya). From time to time conflict arises between the forces participating in this operation – for example as was the case in July 2020 when France notified NATO it was ending its involvement in a maritime operation in the Mediterranean until after examination of the causes and after drawing conclusions from the incident between French and Turkish warships.[111]

As for the patrol missions to prevent arrival of refugees from the North African coast in Europe, the International Organization for Immigration mentions that the sharp increase in the number of fatalities at sea was due to a decrease in the number of maritime patrols conducted by the NATO forces in recent years, which has led to a rise in the number of deaths.[112]

Between August 3 and 16, the Sixth Fleet carried out a large-scale exercise in the Mediterranean, where the last such exercise was carried out in 1981 at the height of the Cold War. The exercise included various scenarios. It combined forces both in and outside the Sixth Fleet's area of responsibility, and it provided prestigious training on sea and on land against a challenging adversary. Approximately 36 warships took part in the exercise, ranging from aircraft carriers to submarines, and also some 50 units which integrated in the exercise virtually. The exercise was commanded from on board the *Mount Whitney* command ship.[113] The spokespeople of the forces that participated in the exercise noted the rise in superpower tensions and in this case between Russia and the United States, tension that causes the execution of exercises that improve the joint operations of the NATO forces, but which also send a message of commitment on the part of the United States toward its NATO allies.

NATO Forces Activities in the Black Sea has increased dramatically in 2021 and has included a large number of exercises and operations. On March 18, 2014, Russia officially annexed Crimea and the majority of the international community does not recognize this annexation, instead viewing Crimea as Ukrainian territory. The West, spearheaded by the United States and the European Union, imposed economic sanctions on Russia. NATO granted Ukraine the status of an Enhanced Opportunities Partner in June 2020, a status which is granted to countries like Sweden, Finland, Georgia, Austria and Jordan. This status means that Ukraine will have access to more programs and collaboration and information sharing exercises, including conclusions which are published when the exercises end. It must be noted that the naval forces of

111 "France suspends role in NATO naval mission over tensions with Turkey", *France24*, July 1, 2020.

112 Lorenzo Tondo, "Migrant boat capsizes off Libya, killing 57, as regional toll for 2021 nears 1,000", *The Guardian*, July 27, 2021

113 "Mount Whitney and Sixth Fleet Underway for LSE", July 27, 2021

the United States and NATO from time to time carry out routine patrols in the Black Sea as part of the freedom of navigation activity in the region. In addition, NATO forces have ramped up their presence in the region and they frequently carry out naval exercises as a show of military support for Ukraine and to prevent additional unilateral measures from Russia. In April 2021 Russia announced a six-month closure of several regions in the Black Sea to foreign warships (from April 24 to October 24), the period during which NATO usually carries out its maneuvers in the region.[114] The Russians noted that the restrictions would apply to the region along the Crimean coastline between Sevastopol and Gurzuf, a region which is near the Kerch peninsula, and a small area near the western tip of Crimea. In addition, Russia announced in early April that it was beginning to evacuate most of its forces from the Crimean Peninsula as part of its desire to reduce the level of friction between it and Ukraine. Despite this, the state of relations between Russia and Ukraine remains tense.

In the section discussing the Russian navy, the Sea Breeze 2021 exercise the took place in June-July 2021 is discussed at length.

On July 2, NATO members Greece, Romania and Turkey took part in air defense exercises in the Black Sea. The United States maintains a permanent presence in the Black Sea countries in order to deter the Russian aggression. The Crimean Peninsula, which was annexed by Russia in 2014, is merely 200 kilometers away from NATO shores. Additionally, NATO maintains, on a permanent basis, 200 American soldiers and two fighter aircraft in continual readiness in the Mihail Kogălniceanu airbase in Romania (whose operation is financed by the United States).

The activity of the NATO naval forces in the Baltic Sea and Atlantic Ocean included several activities, the main one being the annual BALTOP 50 maneuver, which was carried out between June 6 and 18, 2021 led by the United States with participation of the Standing NATO Maritime Group 1 (SNMG1) and the minesweeper force of the Standing NATO Mine Countermeasures Group 1 (SNMCMG1). The exercise was intended to improve the interoperability and the level of operational readiness between the naval, air and amphibious ground forces of the participating countries. In addition, the exercise's goal was to deter possible aggression from potential threats and to allay the concerns of the regional allies and its partners in the context of NATO's undisputed commitment to defend them. Forces from 16 countries took part in the exercise, including 40 ships, 60 aircraft and 4,000 soldiers. The exercise's

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114 For more on the maritime dimension of the dispute between Russia and Ukraine, see: Shaul Chorev, "Key Naval Fleets – Trends and Changes", *Maritime Strategic Evaluation for Israel 2020/21*, pp. 78–80.

scenario focused on a naval response to a crisis looming in the Baltic Sea region with multinational naval units carrying out combined operations which include maritime control and freedom of navigation operations. The air forces that took part in the exercise assisted the naval forces in providing air cover, building a maritime area picture and supporting amphibious operations.[115]

New British Naval Strike Group

Figure 24: Makeup of the British Strike Group

With the completion of the building of the new British aircraft carrier, *HMS Queen Elizabeth*, and with the completion of its sea trials, the British have assembled a new strike group consisting of Royal Navy destroyers and frigates (see figure 24), which have been joined by two NATO allies vessels: the American destroyer, *USS The Sullivans* and the Dutch *HNLMS Evertsen*. The group began its 28-week tour in June 2021, during which time it will travel 26,000 nautical miles from the Mediterranean to the Red Sea, from the Gulf of Aden to the Arabian Sea, and from the Indian Ocean to the Philippines Sea, etc. During this tour, the group is going to call at ports in India, Japan, South Korea and Singapore and in the South China Sea region. The British proudly emphasize that this is the largest group Her Majesty's Navy has managed

115 "NATO Standing Naval Forces Participate in the 50th Interation of Exercise BALTOP", June 21, 2021.

to assemble in a generation.[116] On July 6, the strike group passed through the Suez Canal en route to the South China Sea and the Western Pacific Ocean. This is the first time since 1997 that Britain exercises a naval force in this region. The last time a British task force operated there was the visit to Hong Kong prior to the handover of the former colony to the People's Republic of China on July 1, 1997.

There is no doubt France and Britain are the two main countries in NATO (except for the United States) which are capable of activating strike groups of any significant size. This is also the reason why when the British exited the European Union, it was important for the French that Britain remain a NATO member.

The Indian Navy

India stresses the role of its navy in protecting its natural wealth, keeping its trade routes open in order to develop economically and to maintain its international standing in the world. Accordingly, India is compelled to build and operate a large, powerful navy which must remain in a high state of readiness so that in the event of a security crisis, or in case of natural disasters such as floods, droughts, cyclones, earthquakes or other hazards – it would be capable of fulfilling its missions efficiently and safely.

Building the Naval Force

The Indian navy is one of the world's largest. Its order of battle consists of 10 destroyers, 13 frigates, 17 submarines and one aircraft carrier.[117] India is expected to launch a second submarine – SSHN Arihant class for its strategic fleet and also a second aircraft carrier (which has been designed and built in India) this year. However, in India plans are one thing, the execution is quite another and there may well be delays in this plan.

In order to address the imbalance with the Chinese navy (which is the reference navy), the Indian navy plans to acquire several new, advanced vessels, in particular submarines (both nuclear and conventionally powered). Two new Arihant model submarines are in different stages of construction and are scheduled to be added to the Indian navy by 2025. Three submarines, larger than the Arihant (model S-5) are in the pipeline for construction in the second half of the decade. The Indian

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116 "UK Carrier Strike Group 2021: Who's Joining HMS Queen Elizabeth On Deployment"? *Forces Net,* May 23, 2021.

117 Benjamin Brimelow, "A year after a showdown on 'the roof of the world,' India is gearing up to take on China at sea", *Insider*, June 3, 2021.

navy is preparing for the construction of six nuclear attack submarines and by 2025 to replace the leased SSN *INS Chakra* submarine with a newer Russian submarine model Akula – class SSN.

By the end of the decade, the Indian navy is scheduled to complete the construction of seven improved stealth frigates, of the Nilgiri-Class and four frigates of the Admiral Grigorovich class, to being built by Russian shipyards and two by Indian shipyards.

The Indian navy is building a new naval base, which is being developed as part of the Varsha Project (INS Varsha). The new base is supposed to be the home base of the submarine fleet and of the new nuclear ships. It has been planned to be located at a radius of approximately 200 km from Visakhapatnam, the headquarters of the Indian Navy's Eastern Fleet Command at a site named Rambilli, which is 50 km away from Visakhapatnam (see Figure 25).

Figure 25: The new Indian Naval Base

The Indian Navy's budget

Since its budget has been diminishing in recent years, the Indian navy has diluted its plans to maintain a force of 200 warships down to 175, and has scaled back its long-term procurement budget. However, the Indian navy budget for 2021 was $4.55 billion, representing an increase of close to 22% compared with the $3.73 billion in 2020. The increase enables the Indian navy to acquire, through the U.S. Foreign Military Sales program, 10 tactical UAVs MQ-9 class Reaper made by the American company General Atomics. In addition, the Indian navy is in the process of acquiring information from other countries in an effort to identify a possibility of leasing weapons as a mechanism that will bridge the gaps.[118]

The budget earmarked for maintenance of the Indian navy's warships and submarines in 2021 stands at $3.19 billion compared with $3.13 billion in the previous budget.

Activity

This year we have decided to direct our attention to the Indian navy's activity in the western Indian Ocean – the Gulf of Aden, Horn of Africa, and the Red Sea.

In 2015, Indian Prime Minister Narendra Modi launched his diplomatic initiative for the Indian Ocean, named Security and Growth for all the Region. The vision is to build broad trust and advance mutual respect for the maritime laws and to peacefully resolve disputes between the region's countries. In fact, this initiative was also a response to the Chinese Belt and Road Initiative, and the failure to respect the international rulings on all matters concerning sovereign territorial water boundaries in the South China Sea region.

The Gulf of Aden and the Gulf of Oman form the western sector of the Indian Ocean and are in fact included in this initiative even though its more pressing targets were countries like Sri Lanka and the Seychelles Islands, where the Chinese penetration was more immediate and conspicuous. Thus, for example, as part of this initiative, India built and delivered two patrol boats to the Seychelles Coast Guard in April 2021.

As the importance of the Red Sea for international trade increases, the Indian navy's activity in the western region of the Indian Ocean and in the Red Sea has increased. More and more navies are increasing their activity in the Gulf of Aden region and in

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118 Amrita Nayak Dutta. "Faced with budget crunch, Navy could relook at long-term modernisation plans, lease vessels," *ThePrint*, March 12, 2021.

the Red Sea. With regard the Indian navy, the previous review already noted that in 2018 India signed an agreement with Oman giving India access and use of the Duqm Port, which is intended to serve the Indian navy when it conducts operations in the western region of the Indian Ocean. This is, among other things, an expression of the importance India attaches to protecting its shipping routes, and in particular in all matters of energy imports from the Gulf States, which make up the lion's share of the energy the developing Indian economy needs. In May 2021, India extended two pivotal defense pacts with Oman, her oldest strategic partner in the region. This strengthens the assessment that New Delhi is bolstering its defense partnership in the western Indian Ocean region against a backdrop of the increasing Chinese presence there.

In April 2021 a three-day naval wargame was carried out in the Arabian Sea between a French navy task force and the Indian navy. The wargame was conducted against the backdrop of the growing unease with the increasing Chinese presence in the Indian Ocean region. The wargame consisted of the French task force led by the *Charles de Gaulle* aircraft carrier and a strike force of the Indian navy, which included the guided missile stealth destroyer *Kolkata*, the guided missile frigates *Tarkash* and *Talwar*) a refueling and supply ship, a *Kalvari* class submarine and long-range patrol aircraft class P-8I. The two parties stressed the shared interests and commitments to security in the Indian Ocean.[119] It should be noted that the French task force made its way through the Suez Canal just a few days before the Ever Given blocked it, a fact indicative of the problematic nature of deploying navies via choke points susceptible to being blocked.

India independently carries out anti-piracy operations in the Gulf of Aden. In June 2021 the Indian frigate *Trikand* participated in a joint wargame with European Union forces stationed west of Somalia as part of the EU NAVFOR Somalia – Operation Atalanta. Besides the *Trikand* frigate from the Indian navy, other participants were the Italian frigate *Carabiniere*, which served as the flagship of the game, the Spanish frigate *Navarra*, the French frigate *Surcouf* and the amphibious attack helicopter carrier *Tonnerre*. The exercise included sending of helicopters on naval missions such as search & rescue, and overpowering exercises on suspicious ships. In August 2021, the *Trikand* participated in another joint wargame with the German frigate *Bayer* in the Gulf of Aden.[120]

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119 "Indian and French navies begin three-day wargame in Arabian Sea", *The Economic Times, News*, Apr 26, 2021.

120 Dipanjan Roy Chaudhuri, "India-EU conduct conduct naval exercise to uphold rules-based order in Indo-Pacific region", *The Economic Times*, June 21, 2021.

The Indian frigate *INS Tabar* entered the Red Sea in early September 2021 and crossed the Suez Canal en route to the Egyptian naval base in Alexandria. After its visit in the naval base, the frigate conducted a joint exercise with the Egyptian frigate *Alexandria*. For the Egyptian navy, the exercise formed part of its joint training program with global peers in order to improve its people's combat capabilities, to enable it to overcome shared challenges and to guarantee maritime security and regional stability. The exercise included a broad range of maritime operations and combat exercises, including coping with an asymmetrical threat environment and joint maritime security operations.

After completing its visit to Alexandria, the frigate crossed the Suez Canal again southwards. On its way, on September 10, 2021, it conducted an exercise together with two Sudanese navy ships. The Sudanese guard ships *Almazz* and *Nimer* took part in the exercise, which was carried out close to the navy base at Port Sudan together with the Indian navy frigate *INS Tabar*. The official Sudanese news agency (SUNA) reported that the exercise was carried out as part of the Sudanese armed forces general command's program, "aims to strengthen the exchange of experiences with the armed forces of brotherly and friendly countries, especially the navy". The Indian Navy spokesman noted that the exercise is part of the Indian Navy's routine deployment and that the collaboration with the Sudanese Navy in the Red Sea was "maiden maritime partnership exercise".[121]

In November 2020, and as part of the Indian government's humanitarian aid mission, the Indian navy ship *Airavat* entered Port Sudan with a shipment of 100 tons of food for the people of Sudan. This mission is consistent with India's Prime Minister Modi's vision for security and growth for everyone in the region – a strategy named SAGAR, which attributes importance to India's relations with its maritime neighbors, especially in the context of China's entry into the Indian Ocean and the Red Sea as part of its Belt and Road Initiative.

Finally, the India navy will continue to try and position itself as an ocean-oriented fleet with strategic capabilities and as a navy that has maritime power that will try to deter its traditional rival China from acquiring influence in the Indian Ocean region. Despite the United States' continuing attempts to make a close ally out of India and to sever it from its traditional ties with Russia, India will try to persist in maintaining diversity in its procurement sources, and its collaborations with countries like Russia, in the spirit of the policies of the Non Alignment Movement (NAM). India will also maintain

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121 "Sudan and India conduct naval training exercise in Red Sea", *Sudan News Agency (SUNA)*, September 12, 2021.

its membership in the Quad security dialog, which is a strategic dialog between the United States, Japan, Australia and India, taking place through talks between the member states on the one hand, and on its network of strategic relationships it has developed in recent years with the United States on the other hand. This matter will be reflected also in India's maritime strategy, which is updated from time to time.[122]

The Turkish Navy

In the Center's situation assessment for 2020–2021, a comprehensive paper was included, entitled - "The Turkish Navy – Its strengthening process and operational doctrine".[123] Therefore, this review will only cover developments and changes that have taken place in the past year vis-à-vis the comprehensive paper.

This past year has been characterized by severe tensions between Turkey and France following a clash between the two countries' navies in the Eastern Mediterranean in the summer of 2020, the escalating tensions that might erupt into open hostilities between Turkey and Greece with respect the demarcation of the boundaries of the two countries' Exclusive Economic Zones, including the dispute over Cyprus' Exclusive Economic Zone. To this one should add the shock in certain European capitals, in particular in Paris, from Turkey's successful intervention in Libya, which has added another dimension to the already-long list of grievances between the two parties. Turkey's assertiveness and its military moves in Syria or, more recently, in its assistance to Azerbaijan in its battle against Armenia, in which territories which had belonged to Azerbaijan were taken back from Armenia, Turkey's close ties with militant Islamic groups in Syria and the latter's use of Turkey's military operations are triggering a harsh, albeit not always rational or justified, response on the part of some of its allies in NATO.

As time goes by it transpires that Turkey's operations in the eastern Mediterranean is more and more derived from an ambitious legal and geopolitical doctrine, which is based on a claim of sovereignty over a vast maritime territory – the "Blue Homeland", or Mavi Vatan in Turkish.[124] This strategy was developed by several admirals who

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122 Shishir Upadhyaya, *India's Maritime Strategy – Balancing Regional Ambitions and China*, Routledge, June 30, 2021

123 Shlomo Guetta, "The Turkish Navy – Its Strengthening Process and Operational Doctrine", in Shaul Chorev and Ehud Gonen (eds.), *Maritime Strategic Evaluation for Israel 2020/21* (Haifa: Maritime Policy and Strategy Research Center, University of Haifa, 2021), pp. 168–186.

124 Omri Eilat and Ayal Hayut-Man, "The Turkish Maritime Doctrine – 'The Blue Homeland'", in Shaul Chorev and Ehud Gonen (eds.), *Maritime Strategic Evaluation for Israel 2020/21* (Haifa: Maritime Policy and Strategy Research Center, 2021), pp. 187–195.

were aware of the strategic importance of the maritime domain, and which was endorsed and adopted by the military, the political establishment, the economic establishment and the intellectual elites in Turkey.[125] The strategy was adopted by President Recep Taip Erdogan. It afforded him the opportunity to consolidate his alliance with nationalist movements and to provide a legal framework for his operation in Libya. Among other things, the adoption of this strategy increased the importance of the Turkish maritime forces (Türk Deniz Kuvvetleri), which have become ever-more involved in the roll-out of this policy and its derivatives, including their involvement in conflicts throughout the Eastern Mediterranean.

The Turkish Government's defense spending is planned to grow between 2019 and 2025, reflecting the Turkish Government's prioritization of the Turkish defense industries, and in particular the naval defense industry. Turkey's defense spending reached a record in FY 2020 totaling $14.8 billion – a 6.5% increase over the previous year (see figure 26). This growth trajectory is expected to continue and reach $17.5 billion by 2025.[126]

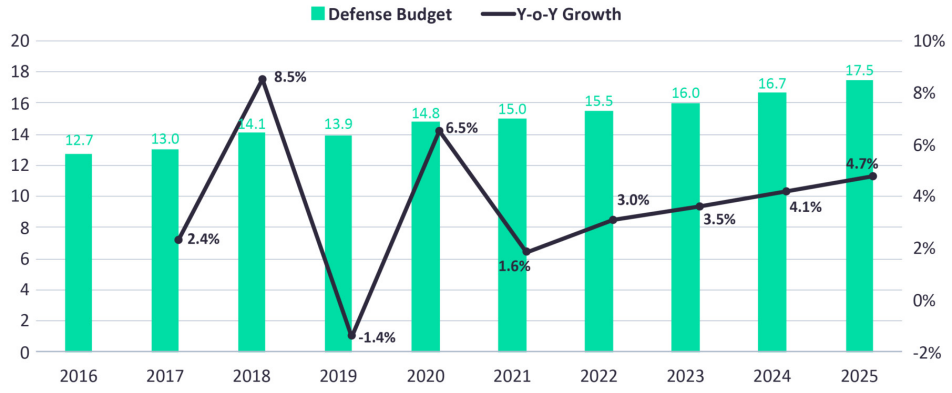

Figure 26 Turkey's defense spending, 2016–2025

Following the sanctions imposed by the United States on Turkey due to its acquisition of an S-400 air defense system from Russia, the local solutions for the force building of the Turkish navy have been brought forward as the main solutions for the growth of its force. Accordingly, the Turkish defense industry was also prioritized to support

125 Aurélien Denizeau, "Mavi Vatan, the 'Blue Homeland' The Origins, Influences and Limits of an Ambitious Doctrine for Turkey", *Études de l'Ifri, Ifri*, April 2021, p. 6.

126 Turkish defense spending remains top priority for government in 2021 despite COVID-19 impact, *GlobalData*, Aerospace Defense & Security Intelligence Center, Mar 3, 2021.

the navy and to upgrade its fleet and the weapon systems it uses. Therefore, this shift of reliance on developments from the Turkish industry was intended to transform the Turkish navy into a world power-class navy, similar in size to Britain or France. This is seen in the construction of the amphibious helicopter-carrier assault ship *Anadolu TCG*, whose construction began in 2016 and whose sea trials began in 2021. It is intended to enter into service in 2022. The *Anadolu* is a multipurpose amphibious assault ship that can, to an extent, be regarded as a miniature aircraft carrier intended to operate at the head of a Turkish strike force in the Aegean Sea, Black Sea and Mediterranean regions, as well as in the Indian Ocean and the Atlantic Ocean.[127] In the inauguration ceremony of the first Turkish-built frigate, the *Istanbul*, on January 23, 2021, the Turkish President declared that the entry into service of the amphibious attack ship the *Anadolu* is a sign that the Turkish navy will extend its operations into the oceans.[128] One must bear in mind that the Turkish navy is the "primary victim" of the sanctions the United States imposed on Turkey following its acquisition of Russian S-400 air defense systems. The Navy had planned to operate F-35B (capable of vertical take-off and landing) from on board its new assault ship, the *Anadolu*, thereby turning it into a light aircraft carrier.

Figure 27: The amphibious assault ship Anadolu

In the coming two years, the Turkish navy is expected to obtain two large landing craft (LST), which will be the largest ships in the world of this class. Over the coming decade the Turkish navy will be receiving frigates (I Class), corvettes (Ada Class) and destroyers (TF-2000 Class). The plan to build Istanbul-class frigates includes the building of four frigates to replace the old Yavuz class frigates. The first ship was delivered to the Turkish Navy in early 2021. The rest are going to be delivered by the

127 "TCG Anadolu Multipurpose Amphibious Assault Ship", *Naval Technology*, June 1, 2021.

128 Tayfun Ozberk, "Analysis: The Future Of The Turkish Navy", *Naval News*, February 15, 2021.

mid-2020's. The Golcuk Naval Shipyard is supposed to complete the construction of six Class 214 (Piri Reis class) submarines by the mid-2020's. The half-life renovation program for the Barbaros class frigates and the 209 class submarines built in German shipyards (Preveze Class Submarines), are supposed to enable them to remain in service until the mid-2030's. The Turkish navy's development program also includes a prototype of an unmanned surface vehicle (ULAQ), which is being developed locally (AUSV).

At the end of May 2021, the Turkish navy kicked off its Sea Wolf exercise, which continued through to June 6 and was intended to examine the operational level of the naval forces. The exercise also included collaboration with the air and ground forces. 25,500 crew members, 132 ships, 10 submarines, 43 aircraft, 28 helicopters and 14 UAVs took part in the exercise, which practiced field warfare, anti-submarine warfare, electronic warfare and finally, maritime search and rescue exercises and manpower saving scenarios. At the end of the exercise, some of the participating ships paid visits to 22 Mediterranean ports.

Despite Turkey's tensions with its NATO allies, in particular the United States and France, Turkish naval and air forces participated in a NATO exercise in early July 2021 in the Black Sea, which was intended to improve the interoperability of the Alliance, to practice air-to-sea communication and to build stronger relationships between the allies. Forces from Greece, Romania, a NATO AWACS aircraft, three frigates from the NATO 2 (SNMG2) group and the Italian navy's flagship also took part in the exercise. After the exercise had been completed, the forces joined the Sea Breeze 2021 exercise, which has been described in the section on NATO operations in the Black Sea. The participation of Turkish forces in these NATO exercises reflects a desire on both sides to maintain the treaty framework, despite Turkey's image as the alliance's "bad boy".

Turkey, which up until the late 1990s was an importer of navy ships and submarines from foreign shipyards, and which based its surface fleet on American Hazard Perry Class frigates, is gradually becoming an exporter of ships and combat systems, a fact which is also conducive to upgrading its political positioning. The Istanbul shipyards recently completed the building of the first of two MILGEM-class corvettes. In the delivery ceremony held in mid-August 2021 at the Istanbul shipyards, and which was attended by Turkish President Erdogan and Pakistani President Dr. Arif Alvi, the two leaders noted that "these ships will bolster Pakistan Navy's capabilities towards maintaining peace and security in the Indian Ocean Region (IOR)". The Turkish shipyard is helping the Pakistani shipyards in Karachi to set up the production line

in which four additional corvettes of this class will be built for the Pakistani navy.[129] This aspect of collaboration has to be viewed against the broader perspective of the strengthening relationship between Turkey and Pakistan, including the reference to the challenges both countries are bound to cope with after the completion of the United States' and NATO's withdrawal from Afghanistan.

The Egyptian Navy

According to the Global Firepower Index for 2021, the Egyptian navy is ranked seventh in the world.[130] This ranking reflects Egypt's desire to become the most powerful Naval power in the Eastern Mediterranean and in the Red Sea Basin. According to this paper's author, the ranking is based on the types and quantity of ships owned by the ranked navies, and disregards other aspects such as the quality of the combat systems, the quality of their operation etc., however the paper does point out a clear, undeniable trend, and that is of a navy, which in recent years has received exceptionally copious resource investment on the part of the Egyptian government, as part of an understanding of its importance in the emerging geopolitical and geo-strategic challenges in the Middle East.

The Force Building Plan of the Egyptian Navy

Egypt, which in the 1980s and 1990s began its procurement of American weapon systems (and in the case of the Egyptian navy frigates from the Oliver Hazard Perry class) to replace its ship order of battle which was based on the Soviet arsenal), has changed direction and, due to political reasons, has begun diversifying its defense procurement, including that for the Egyptian navy, as will be described below.[131]

Egypt has become one of only five countries in possession of Mistral-class amphibious assault ships built for it in France: the *Gamal Abdel Nasser* and the *Anwar El Sadat*. Ships of this class enable Egypt to carry out amphibious operations far from its territory throughout the Red Sea (primarily) and in the Mediterranean.

In April 2021 the Egyptian navy received the second frigate built for Egypt in the Bergamini-class FREMM at the Fincantieri shipyard in Italy. These two frigates were

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129 "Pakistan's first MILGEM class corvette launched in Istanbul", *Naval Technology*, August 17, 2021.

130 "2021 Egypt Military Strength", *Naval Forces, Global Fire Power.*

131 Further details on the Egyptian Navy are available in Shlomo Guetta's paper, "The Egyptian Navy – Its Origins and Its Future (Is It on Its Way to Becoming a 'Green Water' Navy?)" in Shaul Chorev and Ehud Gonen (eds.), *The Maritime Strategic Evaluation for Israel 2019/20* (Haifa: Maritime Policy & Strategy Research Center, 2020).

originally intended for delivery to the Italian navy, however in view of the opportunity to supply them in the Egyptian navy's procurement program, the Italians decided to change the sequence of deliveries (the first was delivered to the Egyptian navy in December 2020).[132] Besides this, the Egyptian navy is also procuring frigates from this series named Gowind 2500, and with the Egyptian name El Fateh, which are being built for Egypt by the French shipyard Naval Group Lorient and assembled in the Alexandria Shipyards in Egypt. The fourth frigate of this series, which has been built entirely in Egypt, was delivered to the Egyptian Navy in a ceremony held on January 1 2021 at the Alexandria Shipyards. It is indicative of the importance Egypt attributes to the building of a national infrastructure for construction of advanced ships for the Egyptian navy.[133] This issue was expressed in the words of President al-Sisi at the opening ceremony of the Navy Base "July 3" (see below). Al-Sisi raised the Egyptian flag on 47 rigid-hulled inflatable boats (RHIB) for the Egyptian navy's special forces, which have been built in Egypt and commissioned in the service of the special units' personnel of the Egyptian navy.

At the start of this decade, Egypt built four missile boats of the Ambassador MK III class in the United States, from the American manufacturer VT Halter Marine. The ships were completed between 2013 and 2015. With a length of 63 meters and 600 tons displacement, upon delivery they were equipped with sea-to-sea missiles type RGM-84 Harpoon, and they are also equipped with a 76 mm cannon made by the Italian company Oto Melara and a Vulcan Phalanx anti-missile weapon system. One of the ships took part in an Egyptian task force which consisted of four ships, and which sailed on March 26, 2015 through the Suez Canal to Yemen to support the operation, led by Saudi Arabia, against the Houthi rebels.[134] In 2021, the US Congress approved equipping them with Super Rapid RIM-116 missiles, which is a light, rapid-response "fire and forget" missile intended to destroy anti-ship cruise missiles, air-to-sea missiles and land-based anti-ship missiles, especially in a state of asymmetrical warfare.

In early August 2021 the fourth submarine, of the 209/1400 class, was delivered to the Egyptian navy. Mohammed al-Kanani, head of the Military Studies Unit in

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132 The FREMM is a multi-purpose European frigate designed by the Fincantieri and Naval Group for the Italian Navy, France and a model for export. There is a series in France named Aquitaine, while in Italy thy are named Bergamin. There is also an anti-submarine, air and surface version in the series.

133 Nathan Gain, "Egyptian Navy Commissions First Locally Built El Fateh-Class Corvette" *Naval News*, January 7, 2021.

134 "Four Egyptian warships en route to Gulf of Aden", *Aharam Online*, March 26, 2015.

the Cairo-based Arab Forum for Analyzing Iranian Policies, said that "Egypt is developing its submarine fleet to maintain its place in the region's naval power balance". He added that this was not the last word in the procurement process and that "As many countries in the region are boosting submarine capabilities […] Egypt will not be satisfied with four submarines from Germany". According to al-Kanani, this can be explained by the fact that it operates "two fleets: the Northern Fleet in the Mediterranean and the Southern Fleet in the Red Sea, with the growing challenges and threats to secure navigation [as well as] combat terrorism and arms and terrorists smuggling."[135] The current contract between Egypt and the German shipyards include an option to order two more submarines.

Organization of the Egyptian Navy for its Missions

In January 2017, the Egyptians decided to split the Egyptian navy in two: the northern fleet and the southern fleet. The area of operations of the northern fleet covers the Mediterranean region and its mission is to secure Egypt's strategic northern and western fronts. The southern fleet is in charge of the Suez Canal and the Red Sea, and is responsible for securing the eastern and southern front. The split has improved the performance and flexibility of several commands of the naval forces and has provided a new perspective on the Egyptian force building, which is based on the nature of the operations assigned to each fleet, defined by the operational region's geopolitical context.[136]

The northern fleet is intended to deal with the growing geopolitical conflicts in the Eastern Mediterranean region over maritime regions and to protect the energy resources extracted from the sea. Its main mission is to defend Egypt's economic interests, especially the newly developed gas fields. In addition, the northern fleet is in charge also of controlling the flow of illegal immigration from North Africa to Europe.

The southern fleet deals mostly with deterring the security threats arising from the political instability in Yemen and the Horn of Africa, where Iranian-backed terrorist organizations and militias are continually harassing shipping and blocking vital maritime chokepoints. In this sense, the southern fleet of the Egyptian navy plays a decisive role in securing international shipping and trade between Asia, Africa and Europe via the Red Sea and the Suez Canal.

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135 Agnes Helou, "Egypt receives fourth German S-44 submarine at Alexandria base", *DefenseNews*, August 3, 2021.

136 Dalia Zaida, "The Egyptian Navy's Journey from Surviving to Thriving", Majalla, July 9, 2021.

In early July 2021 Egyptian President al-Sisi inaugurated the "July 3 Naval Base" at the Port of Gargoub, on Egypt's northwestern Mediterranean coast approximately 70 km west of Marsa Matrouh. The giant new navy base, which covers an area of 2650 Dunam (approximately 650 acres), has been named "July 3" to mark the end of the Muslim Brotherhood regime headed by President Morsi, in 2013. Senior delegations from neighboring Arab countries took part in the inauguration, including Sheikh Mohammed bin Zaid al-Nahyan, the Crown Prince of Abu Dhabi and Deputy Supreme Commander of the United Arab Emirates Armed Forces; and the President of the Libyan Presidential Council, Mohamed al-Menfi. The new naval base is the third naval base, and the fourth Army base, built in the past five years. Other military bases are: the Berenice Naval Base on Egypt's southern border with Sudan on the Red Sea, the main naval base at Port Said on the southeast of the Suez Canal, and the famous army base Mohamed Naguib at Marsa Matrouh on the Mediterranean. The "July 3" base is the largest military base of its kind in Africa and the Middle East, and the mission of the forces operated from it is to secure the El-Dabaa Nuclear Power Station under construction by the Russian concern Rosatom. In September 2018, the Egyptian navy hosted the military exercise of the American Central Command, The Bright Star, in which naval, air and land forces from Egypt, United States, Britain, France, Greece, Italy, Saudi Arabia and Jordan took part, in addition to 16 observer countries.

Figure 28: The new Egyptian naval base at Gargoub

The "July 3" naval base is intended to play a decisive role in strengthening Egypt's political and military cooperation with Libya, thereby bringing to an end the Turkish and Russian military intervention there. The participation of the provisional Libyan President, al-Menfi, at the opening ceremony in Gargoub, only reinforces this assumption. As far as the senior Egyptian administration is concerned, Libya represents the strategic security depth on Egypt's western border, and the stationing of Turkish soldiers, and foreign mercenaries under the separate command of Turkey and Russia, on Libyan soil, are a source of concern.

The Egyptian navy uses the diplomatic dimension of the naval strategy, conducts joint exercises with various navies without aligning itself with any one of the blocs. Thus, in October 2020, Egyptian and Russian naval forces took part in a joint exercise in the Black Sea, Friendship Bridge, while in July 2021 Egyptian navy personnel took part as observers in the Sea Breeze 2021 exercises in the Black Sea, "shoulder to shoulder" with navy and air force soldiers from 32 other countries, an exercise which was managed by the United States' Sixth Fleet. In the Red Sea arena as well (the southern fleet), Egyptian navy forces and their American peers carried out a joint naval training exercise in August 2021. The Egyptian frigate *Sagem Taba* and the Ticonderoga class guided missile cruiser *USS Monterey* took part in the exercise. Before setting sail, the forces held joint briefings in the Egyptian Naval Base in Berenice. The naval exercises included securing supply lines and trade routes against new threats, which are one of Egypt's main concerns in the Red Sea en route to the Suez Canal.[137]

The exercises are a continuation of the Egyptian navy's plan to hold exercises with friendly countries. This policy is also a result of the reservations the American administration had expressed regarding the military coup of 2013, which removed Egypt's elected President Morsi and replaced him with General Abed al Fattah al-Sisi. Further evidence of this Egyptian policy is the building of the nuclear power station in western Egypt by the Russian concern Rosatom.

The Iranian Navy

The Iranian navy and the Revolutionary Guards fleet have been an influencing factor, both directly and indirectly, on the events in the maritime arena in the Middle East, and in particular in the Persian Gulf en route to Bab-el-Mandeb. The effect has been direct, or via proxies the likes of the Houthi revels in the Yemen region.

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137 "Egypt, US participate in Red Sea maritime transit training", *Egypt Independent*, August 17, 2021.

Accordingly, in the annual assessment, we have chosen to include a special chapter by Colonel (Res.) Shlomo Guetta and Major Motti Elharar, which reviews this issue.[138]

Iran's strategy in the Persian Gulf and in the Gulf of Oman is one of Anti Access, Area Denial (A2/AD), which seeks to prevent the opponent from entering or operating in areas it regards to be essential to its security and sovereignty. In realizing this strategy, Iran relies primarily on the Iranian navy (its two branches), its geo-strategic location, and the Straits of Hormuz, which is one of the world's most important choke points of oil supply. This Iranian strategy is based on multi-layered naval defenses built on multiple platforms and weapons which, when operated in an integrated manner, are intended to create a saturated situation picture for the enemy forces operating in the region. Iran emphases asymmetrical tactics, such as sending swarms of small vessels (see below), land-to-sea missiles, marine mines, underwater craft, drones and ballistic missiles. In Yemen, Iran provides military support to the Houthi rebels against the coalition headed by Saudi Arabia, which allows Tehran to apply indirect pressure on Saudi Arabia without engaging in direct military conflict. The missiles the Houthis launch against targets in Saudi Arabia and attacks against the Saudi-led coalition's ships are evidence of the fact that Iran is prepared to supply the Houthis with more advanced, more lethal weapons.

Iran operates two naval forces: the Islamic Republic of Iran Navy and the navy of the Islamic Revolutionary Guard Corps, which was established only in 1985 following instructions from Khomeini to set up the Iranian Revolutionary Guards. There are certain overlaps between the two navies, but they are distinct in their training methods and in the way they conduct battle. The Revolutionary Guards corps has a large stockpile of fast, small attack weapons and it specializes in asymmetric hit and run tactics. It is more similar to a naval guerilla force, and it maintains a broad range of weapons for purposes such as coastal defense, and cruise missiles and mines for use against ships. The Revolutionary Guards Navy in the modern era are the outstanding representatives of the small boat swarm tactics, which combine speed, a large number of boats, coordinated maneuvering, low radar signature and concealment. So, on May 10, 2021, a swarm of 13 boats of the Islamic Revolutionary Guard Corps (IRGCN), conducted unsafe, unprofessional maneuvers near ships of the United States Navy, which crossed the Straits of Hormuz.[139]

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138 Shlomo Guetta and Motti Elharar, "The Development of the Iranian Naval Arm in Recent Years and the Implications for Israel and the Middle Eastern Countries" [current volume]

139 Ryan White, "How the U.S. Navy can defeat Iran's swarm attacks"? *Naval Post*, May 29, 2021.

As for the Iranian navy: already in 2016 it announced that it was seeking to develop operational capabilities on the high seas, including in the Atlantic Ocean, and indeed in May2021 the Iranian navy sent two of its ships on a long voyage around the Cape of Good Hope. The ships that were sent on this mission were the converted tanker *Makran* and the *Sahand* missile frigate. Its objectives were not made public, and there was even a concern that their final destination was Venezuela or Syria, however later on the vessels crossed the la Manche Channel and arrived for the Russian Navy Day, which took place in July 2021.

Regarding force building, the Iranian navy was strengthened in June 2021 by a destroyer named *Dena* and a minesweeper named *Shahin*. In the delivery ceremony held at the Port of Bandar Abbas, the then-president Rouhani spoke and noted Iran's intention to develop its navy for operations on the high seas (a statement that was reinforced by the departure of the converted tanker *Makran* and the *Sahand* missile frigate on their long voyage). On the other hand, the Kilo-class Iranian submarine force has been suffering from serviceability issues in recent years. In January 2021 three of the four submarines were spotted in drydock in the Bandar Abbas region.[140]

Since the beginning of 2021, there has been an escalation in the covert battle Iran and Israel are waging against each other, which has earned the moniker The Shadow War. In the maritime domain, since 2019 tit-for-tat attacks have been carried out against commercial shipping, where neither Israel nor Iran have claimed responsibility for any of them. The targets have included Iranian tankers transporting oil bound for Syria; an Iranian ship opposite the Yemeni coast, which served as a floating base for the Islamic Revolutionary Guards, the dominant military force in the country; and these were answered by Iranian attacks against freight ships owned by or linked to Israelis, including a car ferry which was attacked in February 2021.[141]

In April 2021 the Iranian *MV Saviz* was hit. It had been anchored for several years west of the Yemeni coast, where it was serving as a logistical base providing Iranian support for the Houthi rebels. Foreign sources attributed this attack to Israel and associated it with the Shadow War that has been raging for several years between Israel and Iran, ranging from strikes in Syria, attacks on shipping, and attacks on the Iranian nuclear program. The Iranian navy lost one of its largest ships on June 2 – the *Kharj*, which sank in the Gulf of Oman after having been hit by a fire that raged on

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140 H. I. Sutton, "Iran's Best Submarines Have Been Out of the Water for a Month", USNI News, January 31, 2021.

141 Daniel Avis, "Understanding the Shadow War Between Israel and Iran", *Bloomberg*, August 4, 2021.

board for several hours. The *Kharj* was apparently involved in a string of mysterious explosions which occurred in the Gulf of Oman on several merchant ships (tankers) in 2019, which had been caused by limpet mines that had been attached to the hulls of the ships by Iranian divers.[142]

The maritime battle ratcheted up a notch with a deadly drone attack on June 29-30, 2021 on the tanker *Mercer Street* in the Gulf of Oman, which was being operated by an Israeli company. Iran denied involvement, however threats of revenge were heard from Israel. Two crew members died in the assault – one from Britain and one from Romania. This aroused warnings of possible retaliation from Britain, which had lost a crew member, and from the United States, which had created a naval force together with allies in 2019 to help protect the shipping routes in the Middle East. The American Central Command, which investigated the incident, announced that the attack had been carried out by Iranian UAV's, fragments of which were found on the tanker.[143] In a speech at the Herzliya Anti-Terrorist Conference, Minister of Defense Lieutenant General (Ret.) Benny Gantz stated that "one of the most significant tools Iran has developed is its system of unmanned aerial vehicles". He disclosed the name of the base at Kashan (north of Ispahan), where Iran trains terror operatives to fly UAV's which, according to Gantz, "is the keystone of Iran's terror export network in the region".[144] Iran continued to challenge Israel and the international community through responding to Hezbollah Secretary General Hassan Nasrallah's request, which was made due to the dire straits of the Lebanese economy. He asked Iran to send fuel to Lebanon via Syria. The Iranians sent one of their tankers from the port of Bandar Abbas in Iran, which crossed via the Suez Canal, circled Cyprus from the west and arrived unimpeded at the port of Baniyas in Syria on September 13.

As part of the diplomatic component of Iran's maritime strategy, its navy holds joint exercises with other navies, where the most important of all was with the Russian and Chinese navies at the end of December 2019, and another one which is expected to take place in early 2022 (figure 29). The exercises reflect the formation of a Russian-Chinese axis supporting Iran politically at the height of the period in which it is being pressured to return to the nuclear agreement and it is subject to economic and political sanctions by the West.

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142 "Two new warships join the Iranian navy", *The Times of Israel*, June 14, 2021.

143 "U.S. Central Command Statement on the Investigation into the Attack on the Motor Tanker Mercer Street," Press Release, August 6, 2021.

144 Yoav Zeitoun and Nina Fuchs, "Gantz discloses: this is the base in which Iran trains terror operatives to fly UAV's", *Ynet*, September 12, 2021 [Hebrew].

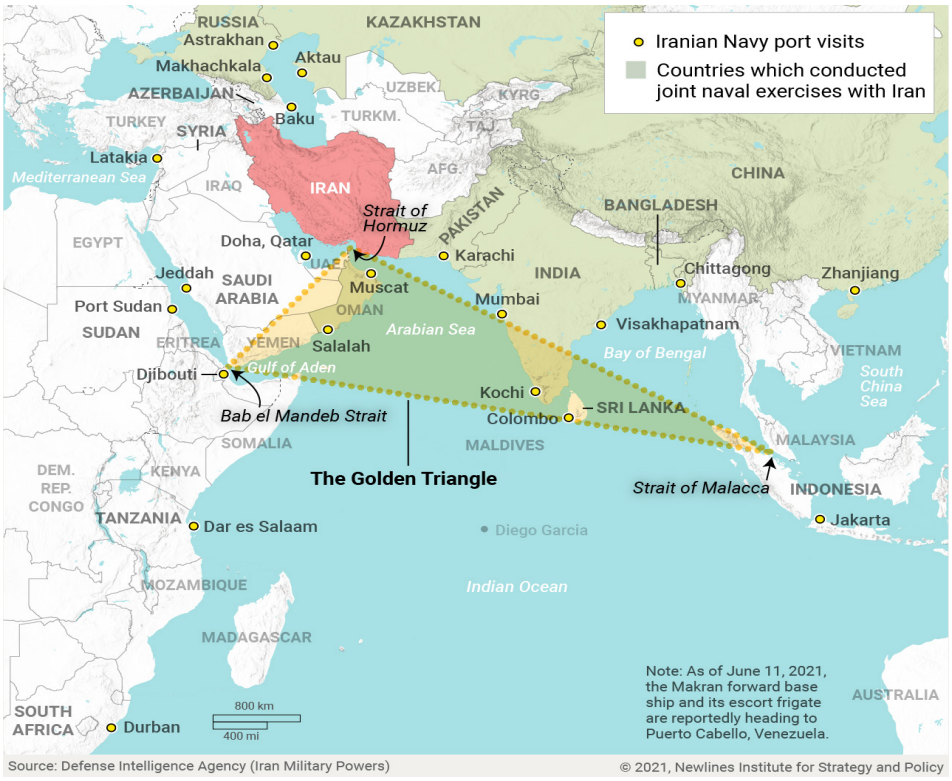

Figure 29: Planned naval exercise of Iran, Russia and China

Finally, over the past several decades, the combined influences of international sanctions and a continuing US presence in the Persian Gulf have restricted Iran's ability to develop and also to be interested in developing a powerful navy capable of projecting its interests abroad. As a result, Iran has chosen to develop the naval branch of the Revolutionary Guards and to focus them on asymmetric warfare and operational tactics which have been described above, such as swarm tactics. The prevailing feeling is that the United States is not interested in continuing its involvement in the Middle East, and its hasty retreat from Afghanistan opens a unique opportunity for Iran to fill this vacuum and build a navy capable of operating on the high seas. The acquisition of the tanker *Mekran* and its conversion into a "mobile maritime base" capable of carrying helicopters, small boats and spec ops forces, as well as the construction of new warships such as the destroyer *Dena*, indicate a new trend toward modernization of the aging IRIN navy as an unavoidable measure for realizing a Shiite crescent led by and surrounding the regional adversaries of Iran.

Conclusion

The recent year saw the continuation of changes in the characteristics of global power and its nature, and the world became more competitive and multi-polar. The naval aspect of this power was emphasized by the key global powers, either in the force buildup plans of the various navies, or in their operational strategies. The trend of geopolitical and geo-economic changes that we have witnessed in the recent decade, such as China's growing power and assertiveness in the global system, the growing importance of the Indo-Pacific Region for the global welfare and security, the development of new markets, and the growth of the world's middle class continued and intensifies this past year.

This past year, the systemic competition intensified between countries and between state and non-state actors. This occurred over international rules and norms. Blocs of influence and competing geo-political and economic values have formed. This competition had impacted the security, economy, and institutions that are the foundations of the way of life of citizens in various countries. It also included continuing deliberate attacks on democratic systems by authoritarian countries and other actors with dubious intentions. This also blurred the fine line between war and peace, as countries use a growing set of tools to fail other countries and force their hand.

Another trend that continued this year was the fast technological changes through new technological breakthroughs, and the digitization of these technologies, which then continued to shape societies, economics, and the relations between the citizen, the private sector, and the state. The forecast is that science and technology will bring considerable advantages and social welfare to countries and their citizens, but will also be a field of growing systemic competition. In the maritime domain, the technological developments increased the examination and development of unmanned platforms and raised awareness to the role of the human factor in 'operating' these devices (Man-Unmanned Teaming).

Global challenges like climate change, global health hazards (like COVID-19), illegal capital, and security and terror issues, will continue to threaten the common security and prosperity and will require international cooperation to deal with them. Among the global challenges, climate change and biodiversity loss will be the most significant to the world's resilience, and need urgent action. The maritime domain is very sensitive to these changes, thus countries must form plans to deal with these challenges, including by activating their respective navies and coast guards.

Strategies in the Indo-Pacific Region

Benni Ben Ari

The Region and its Importance

On November 30, 2018, US Secretary of Defense James N. Mattis announced the renaming of the Asia-Pacific Command to the Indo-Pacific Command. This was done in view of the increasing geostrategic and geopolitical importance of the Indian Ocean region.[1] In the White House a position paper was prepared, entitled U.S. Strategic Framework for the Indo-Pacific. One of its goals was to recommend "how to maintain U.S. strategic primacy in the Indo-Pacific region and promote a liberal economic order while preventing China from establishing new, illiberal spheres of influence, and cultivating [by the United States] areas of cooperation to promote regional peace and prosperity […]".[2]

The Indo-Pacific region, which connects two oceans through the Straits of Malacca, and which borders three continents and 36 countries, is without a doubt the world's largest and most important shipping lane for the near and far future. Practically all of the world powers, including those geographically remote from this region, are increasing their activity and presence there – for geopolitical, geostrategic, and economic reasons. The main activities, crises and geostrategic rivalries and military tensions are playing out in two areas: the South China Sea and the Indian Ocean, in the Straits of Malacca.

Alfred Thayer Mahan (1840–1914), one of the greatest naval strategists, recognized the importance and status of the Indian Ocean. He said: "Whoever controls the Indian Ocean, dominates Asia. This ocean is the key to the seven seas. In the twenty-first century, the destiny of the world will be decided on its waters".[3]

The maritime traffic density in the Indo-Pacific is evidently the world's greatest. Approximately 50% of the global container traffic and more than 80% of the world's oil is transported in this region. It is therefore clear that interruption of the security of the shipping lanes has the potential of triggering an economic crisis in the main destination countries (China, India, Japan and South Korea) and the region's countries

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1 J. Garamone, Pacific Command Change Highlights Growing Importance of Indian Ocean Area, *DOD News*. May 30, 2018.

2 U.S. Strategic Framework for the Indo-Pacific, February, 2018.

3 Ajay Patnaik, Indian Ocean: The key to India's 'Look East Policy, *The Economic Times*, March 21, 2015.

in particular, and to a global crisis in general. This is one of the reasons that India and China (which receive 70% of their oil imports through this region), have altered their maritime strategy in recent years to address these dangers. In addition, several of the world's most critical choke points – Bab-el-Mandeb, Straits of Hormuz, Straits of Malacca, Singapore Straits, the Sunda Strait, the Lombok Strait, the Mozambique Channel, the Taiwan Strait (and even the Suez Canal), and the South China Sea, are all within this region.

Figure 1: The Indo-Pacific Region[4]

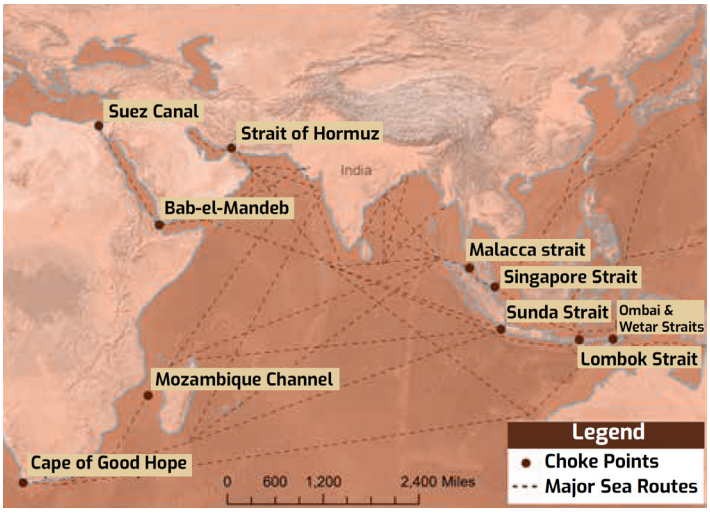

Figure 2: The choke points and sea routes in the Indo-Pacific

4 D. Camroux, and C. Jaffrelot, The Concept of the Indo Pacific in the Geostrategic Discourse, SciencesPo, October 17, 2021.

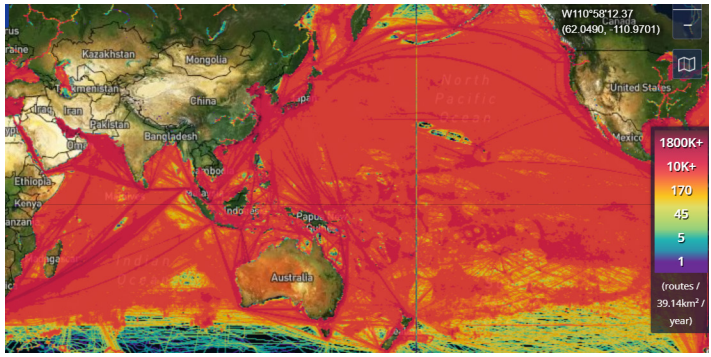

Figure 3: Shipping traffic density in 2020 in the Indo-Pacific region, MarineTraffic

The most explosive international flash points in the world today between the United States and its allies and China is apparently within the confines of the Indo-Pacific, namely – the South China Sea. This fact has resulted in 60% of the United States fleets being present in this arena,[5] which is divided in terms of the United States battle commands between the Central Command – USCENCOM, and the Indo-Pacific Command – USINDOPACOM (The zone of responsibility of the Indo-Pacific Command has been extended westward as far as the African coast. See Figure 4). Another flash point is Taiwan, which is under perpetual threat by China while at the same time it receives political, and perhaps military backing, from the United States.

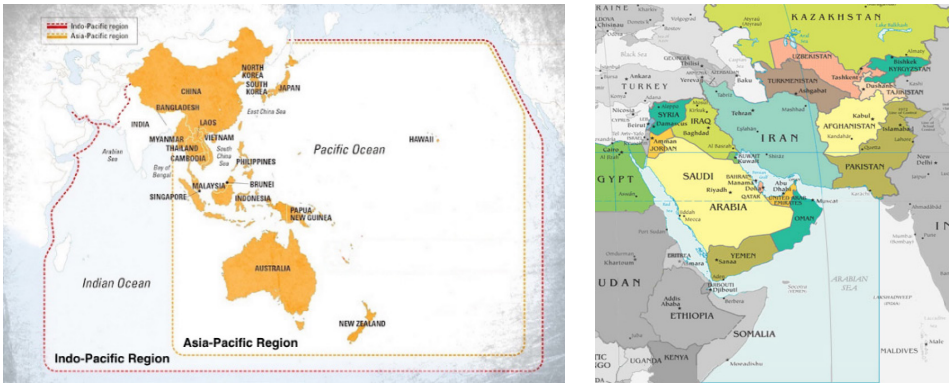

Figure 4: Left: Extending the area of the region under the Indo-Pacific Command.
Right: Central Command, which includes the Middle East and Israel[6]

5 Krishn Kaushik, 60% Navy forces in Indo-Pacific region now: US Navy chief, *The Indian Express*, October 13, 2021.

6 S. Chorev, D. Feith, G. Roughead, S. Cropsey, & J. Dorsett, Why Does US Central Command Now Include Israel?, Hudson Institute, January 21, 2021.

The geostrategic importance of the Indo-Pacific region, and in particular the South China Sea, has greatly increased in the past two decades, primarily due to China's military build-up and its show of military and economic presence with the change in its grand strategy to an "Offshore Balancing" strategy, a move which accordingly also changed the naval strategy,[7] and the progress of the Belt and Road Initiative.[8]

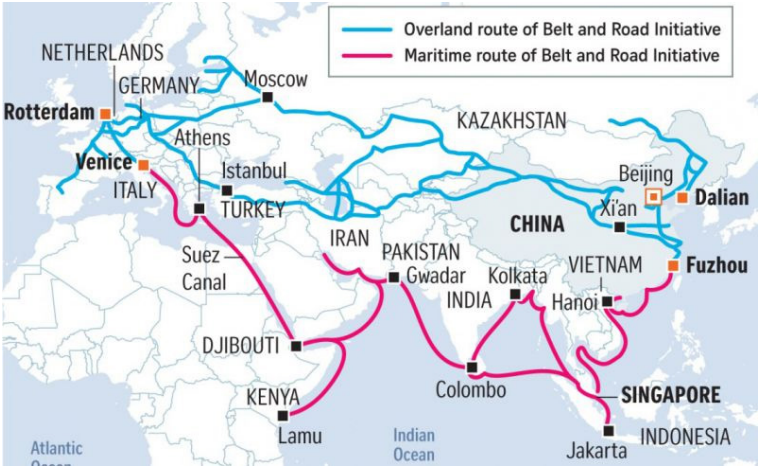

figure 5: China's Belt and Road Initiative for developing infrastructures and economies

Back in 2007, the Quadrilateral Security Dialogue (QUAD),[9] which includes the United States, Japan, Australia and India, coined the phrase "Free and Open Indo-Pacific". This term was later adopted by many other countries that realized that the region was rife with geographic, geopolitical and geostrategic challenges: a top-priority shipping route, piracy, natural disasters, maritime terrorism, military tensions and conflicts, Iranian activity and of course the fear of attempts at altering the regional order. The three principles set for the realization of a free and open region were: 1) Advancing and realizing the order of law, freedom of navigation, free trade etc., 2) The desire for economic growth and prosperity, including trade agreements, partnerships and

7 See more in Benni Ben Ari's paper "The Cat's Out of the Bag" – Geostrategy and Geopolitics in the South China Sea, October 11, 2021 on the Chaikin Chair for Geostrategy and Maritime Policy and Strategy Research Center [Hebrew].

8 A. Chatzky, and L. McBride, China's Massive Belt and Road Initiative, *Council on Foreign Relations*. January 28, 2020.

9 "The Quadrilateral Security Dialogue" was set up at Japan's initiative in 2007 but began actual operations in 2017. The dialog was conducted in parallel to joint military exercises of unprecedented scale. The diplomatic and military arrangement was perceived as a reaction against China, which had ramped up its economic and military strength.

investments; 3) Commitment to peace and stability through enforcement of the law of the sea, cooperation on humanitarian aid issues and natural disasters.[10]

The region's countries and other countries, which share the same interests, primarily economic, turned the term into a strategy based on mutual understanding. However the definition does occasionally assume very different meanings, and in some cases the different term is related to a different interpretation of the "regional order of law", however all of the interpretations recognize the importance of maintaining the rules of world order.[11] China itself does not use this term and despite the fact that China is not mentioned by name in the various definitions, the intention of the strategies is to create a move against China in an attempt to check its expansion and its influence in the region.

China – a geostrategic threat or an economic partner?

In December 1978, Deng Xiaoping, one of the leaders of the Chinese Communist Party, initiated a set of economic reforms which altered the socialist-communist model (which had existed ever since the Mao Zedong era of 1949–1976) of managing the economy based on the principles of communism and a prohibition of private enterprise. China adopted a new system of government – "socialist capitalism", which was also named "socialism with Chinese characteristics".[12] The ultimate goal was to transform China into a superpower, primarily economically. A combination of cultural and traditional values, including the Confucian philosophy, the Sun Tzu theory of war and the hallmarks of the ancient Chinese theory of government, the "Mandate of Heaven", based on the "Five Principles" for existence through engaging its neighbors.[13]

In 1990, in the course of extending the implementation of the reforms, it became necessary to define a grand strategy for China's conduct at the international level. It

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10 Japan Ministry of Foreign Affairs, Free and Open Indo-Pacific, April 1, 2021.

11 Felix Heiduk and Gudrun Wacker, From Asia-Pacific to Indo-Pacific, *SWP*, July 1, 2020.

12 Deng Xiaoping, "Building Socialism with a Specifically Chinese Character", *The People's Daily*, Beijing, June 30, 1984.

13 The guiding principles of China's policy toward neighboring countries (which were suggested jointly by China, India and Myanmar in the 1950s), were approved by China and include: mutual respect of territorial sovereignty and integrity, mutual non-aggression, non-intervention in each other's internal affairs, equality and mutual goodwill and peaceful coexistence. Ministry of Foreign Affairs of the People's Republic of China. The time-tested guideline of China's policy with neighbors, July 30, 2014.

was then that Deng defined the "24-Character Strategy"[14] for achieving the goal of the Chinese leadership, which is to achieve a state in which the economy manages itself according to free market principles, while central economic and political control is maintained. In fact, the most important thing for the Communist Party is its continued rule, and to realize the rigid domestic policy, followed by a like-minded foreign policy. Deng's successors, the "Supreme Leaders", continued with the reform policies which had transformed China into the second largest economic power in the world, with an expectation to take over the first place by 2028.[15] Ever since the 1990s the Chinese economy has been developing across every perceivable parameter. In order to retain China's development, it has to import huge quantities of raw materials, in particular energy components (oil and gas), while at the same time it has to enable exporting its industrial output all over the world.

These past 25 years, the Chinese international trade has increased at an exceptionally rapid pace. In 1995, China's foreign trade – imports and exports – totaled $281 billion, or 3% of the global trade. In 2018, China's total international trade had grown to $4.6 trillion, or 12.4% of the global trade. In 2020, China's total imports and exports approached $5 trillion (32.16 trillion Yuan).

Another, no less important requirement, is the import of food components, the production of which in China is not sufficient to feed its 1.4 billion inhabitants, whose welfare is critical to the continued rule of the Chinese Communist Party. In order to be capable of delivering on all these requirements, China has to have a very large merchant fleet, which is the first or second largest fleet in the world, ensuring the continuation of maritime transport during a crisis. China builds today approximately 40% of all the cargo ships in the world and controls a fleet of over 5,600 ships totaling 270 million DWT.[16]

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14 Deng Xiaoping's 24-Character Strategy was announced in 1990 in response to the world's reaction to the Tiananmen Square massacre in 1989. It was also an answer to the reactions within the Chinese Communist Party to the collapse of the Communist countries in East Europe. The strategy, which had been written in 24 Chinese characters, provided basic principles for how China has to protect its national interests while increasing its contacts with the outside world. The strategy was roughly translated so: peaceful observation; safeguarding our position; coping with issues in tranquility; concealing our capabilities and succeeding in our own time; excelling in maintaining a low profile; and never to claim leadership.

15 Rating the strong economies: Israel in the 30th place, China and the United States locked in struggle at the top, *Ynet*, December 27, 2020 [Hebrew].

16 "China has become the world's second-largest ship-owning nation", *Institute of Shipping Economics and Logistics*, 18, September 24, 2021.

With the transition to a new naval strategy, "Offshore Balancing", China is significantly enlarging its naval force, including to strengthen its presence in the Indian Ocean. The enlargement includes the navy (currently 335 surface ships of various types, including state-of-the-art nuclear submarines and ships carrying cruise missile and antiaircraft missile systems; an intelligence estimate states that by 2030 the Chinese navy will have 450 surface ships and 110 submarines), the Coast Guard (including 135 ships of various sizes, some as large as destroyers and larger, which include weapon systems and some even carry a helicopter or UAV's) and the "Maritime Militia" (approximately 300 large ships, up to 500 tons, armed and with detection, command & control systems).[17] 770 operational ships today are supposed to provide a solution for protecting the country's shores and safeguarding open, secure shipping lanes throughout the entire Indo-Pacific region, including achieving a relative advantage in the activity of the Maritime Militia in the "gray zone". (By comparison, the US Navy nowadays operates only 283 ships and submarines).[18]

Figure 6: Chinese Navy ships[19]

To secure the shipping lanes to and from China, China is carrying out, as part of the same strategy, additional activities – diplomatic and economic – which enable its Navy to operate thousands of miles from its home ports in the Indo-Pacific region, primarily in the Indian Ocean, which is the main and most vital route for its economy (the "merchant marine missions" to import and export) and security. The main fear of attacking or blocking of its shipping lanes, and in particular the choke point in the

17 A. Hollings, "Just How Big Is China's Navy? Bigger Than You Think", *Sandboxx*, July 28, 2021.

18 Military operations that fall within the "Grey Zone," which is a term used to characterize aggressive actions that don't quite meet the criteria to be considered an overt act of war. Grey Zone operations have become an area of increasing focus for nations like China and Russia, who use things like China's Maritime Militia or Russia's mercenary Wagner Group to conduct what are effectively military operations outside the formal purview of their parent state.

19 Zachary Keyser, "China's navy to test Shandong aircraft carrier in 10-day drill", *Jerusalem Post*, December 30, 2020; Steven Wills, "The Hohenzollern Chinese Navy? Part One", *Center for International Maritime Security*, September 24, 2015.

Straits of Malacca, was raised by President Hu Jintao in November 2003. He termed it "China's Malacca Dilemma".[20] And thus, several years later, in November 2012, during a meeting of the 18th Communist Party Congress, it was decided to build up China into a sea-power nation. Two years later, in 2014, the Chinese Institute of Naval Research published the Strategic Scenario in the Indian Ocean and the Expansion of Chinese Naval Power.[21]

Figure 7: Chinese Coast Guard[22] and "Maritime Militia"[23] vessels

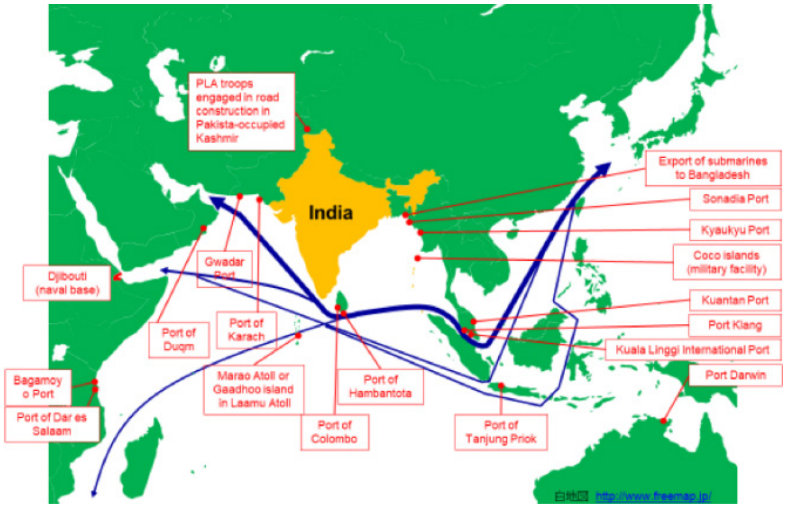

Figure 8: Chinese Economic and military initiatives in the Indian Ocean[24]

20 Pawel Paszak, "China and the 'Malacca Dilemma'", *Warsaw Institute*, February 28, 2021.

21 TriumphIAS, "Indian Ocean & International Relations", July 8, 2020.

22 Caitlin Doornbos, "Chinese law would allow coast guard to fire on foreign vessels in its waters", *Stars and Stripes*, November 5, 2020.

23 Zachary Haver, "Unmasking China's Maritime Militia – Analysis", *Eurasia Review*, May 19, 2021.

24 TriumphIAS, "Indian Ocean & International Relations", July 8, 2020.

In addition to China's "takeover" of the South China Sea, building and arming seven artificial islands, harassing fishermen from other countries and attempts to obstruct oil exploration by some of the countries in the region, and as part of the strategic plan, China is working to publicize and realize its Belt and Road Initiative.[25] This is a plan consisting of constructing infrastructures for transport and industries and building or acquiring ports which double as naval bases, which have been or will be built in future in Djibouti, Gwadar in Pakistan, Hambantota in Sri Lanka, Sittwe in Myanmar, a port in the Maldivian Islands and other ports, which will serve as maintenance and operational bases along the shipping routes to and from China.

Figure 9: Superpower naval bases in the Indo-Pacific[26]

Despite ongoing attempts, mainly by the United States, to increase freedom of navigation operations (FONOPS) and diplomatic complaints (also reaching out to other navies, including NATO and European, to show a presence in the region), China continues uncompromisingly, for the time being, in its policy in the South China Sea and in the Indo-Pacific region.

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25 Jyotsna Mehra, A Look at the Indo-Pacific in 2020, *South Asian Voices*, January 13, 2021.

26 David Tweed and Adrian Leung, "China is Making a Bold Military Power Play", *Bloomberg*, March 6, 2018.

In addition to these activities, as part of its choice of a new grand strategy (Offshore Balancing), China is apparently expanding the zones of its strategy roll-out westwards in the Indian Ocean, as far as the coast of East Africa by adding two "island chains", numbers four and five, to the three existing island chains east of the Indian Ocean and in the Pacific Ocean.[27]

Figure 10: five island chains in China's naval strategy[28]

As part of the Belt and Road Initiative, China is already active in the western Indian Ocean and the Arabian Sea, in infrastructure projects in East Africa, chiefly the Chinese naval base in Djibouti, which adjoins the civilian port, also owned by China, which is intended to receive and support logistically ships as large as aircraft carriers.[29] Various vessels of the Chinese navy participate since 2008 in anti-pirate activities by escorting commercial ships in the Gulf of Aden and the Horn of Africa.[30]

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27 W. Vorndick, China's Reach has Grown; So, Should the Islands Chains, *Asia Maritime Transparency Initiative*, October 22, 2018.

28 David Tweed and Adrian Leung, "China is Making a Bold Military Power Play", *Bloomberg*, March 6, 2018; see also "US, UK aircraft carriers lead show of naval might around South China Sea", *Radio Free Asia*, October 7, 2021.

29 "US, UK aircraft carriers lead show of naval might around South China Sea", *Radio Free Asia*, October 7, 2021; Joseph S. Nye, Jr., "With China, a 'Cold War' Analogy Is Lazy and Dangerous", *New York Times*, November 2, 2021.

30 Antik Panda, "China Dispatches New Naval Fleet for Gulf of Aden Escort Mission", *The Diplomat*, December 11, 2018.

Figure 11: A Chinese warship, type 071 amphibious transport dock ship, entering the Port of Djibouti[31]

The FOIP strategy – Free and Open Indo Pacific

In recent years, geopolitical developments have moved numerous global and regional powers, including India, the United States, Japan, Australia, ASEAN and the European Union countries, to express the Indo-Pacific Region vision and to form bilateral and multilateral partnerships in order to advance the strategic frameworks for cooperation. This is in order to check China's ascent, which is defined as a "strategic competitor" of the United States and its allies in various areas, including advanced technologies, international trade, national security (including its enlargement of its nuclear arsenal) and so forth.

The United States is the leader in setting and realizing the "Indo-Pacific Strategy". In a Congressional debate on China's power and behavior it was said that "China is not an Olympian power".[32] This is a serious misunderstanding of the situation and of China's strategy. But despite this, the attitude toward China's activity is serious, partly because it confronts the United States' allies – India, Philippines, Vietnam and others, especially in the South China Sea, and threatens Taiwan. The geopolitical situation with Iran and the Coronavirus pandemic have proven to be a potent catalyst for broader acceptance of this strategic framework and for greater collaboration and despite the restrictions the pandemic has imposed – the pandemic which originated in China – the Indo-Pacific has received a tremendous diplomatic boost. The European Union countries are under increasing US pressure to make a commitment, whether

31 Sam LaGrone, "AFRICOM: Chinese Naval Base in Africa Set to Support Aircraft Carriers", *USNI News*, April 20, 2021.

32 Colin Clark, "China 'Not An Olympian Power': Presumptive China Ambassador 'Confident' In US", *Breaking Defense*, October 20, 2021.

direct or indirect, to the Indo-Pacific region and, as a consequence, to support the United States against China.[33] It is doubtful whether these countries should agree to the US request and are responding appropriately with such a move.

A position paper written for the White House says that "From the national security standpoint, need to decide how to maintain U.S. strategic primacy in the Indo-Pacific region and promote a liberal economic order while preventing China from establishing new, illiberal spheres of influence, and cultivating areas of cooperation to promote regional peace and prosperity. […] Preserve U.S. economic, diplomatic, and military access to the most populous region of the world and more than one-third of the global economy[…] Loss of U.S. preeminence in the Indo-Pacific would weaken our ability to achieve U.S. interests globally."[34]

Cooperation between the United States and other countries is expressed mainly in a show of presence through conducting joint exercises throughout the Indo-Pacific, including in the South China Sea. Part of these actions are "Freedom of Navigation Operations" – FONOPS which, undoubtably, will intensify China's naval activity and raise tensions in the region. Vessels from eight remote countries, which are not part of the dispute in the South China Sea, have sailed this region in the past year, and have exercised in this area,[35] including a passage of a NATO task force, led by the United Kingdom's *Queen Elizabeth* Aircraft carrier with vessels from The Netherlands, United States, New Zealand, Australia and the United Kingdom.[36]

Despite the tendency in the United States to sound as if it is in a Cold War with China, Joseph S. Nye Jr. rejects this definition and states that in contrast to the Cold War with the Soviet Union, which was based on military and ideological motives, in which containment was a practical goal, the competition with China is a lot more nuanced and there is also a dimension of the economic and social interdependency. The "game" is three-dimensional and includes a division of power at all levels – military, social and economic. A two-dimensional conflict is confusing and misleading in that it underestimates the real challenge posed to the United States – and suggests ineffective strategies. Due to the geopolitical and geo-economic situation around

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33 Council of the European Union, "EU Strategy for Cooperation in the Indo Pacific – Council conclusions", April 16, 2021.

34 U.S. Strategic Framework for the Indo Pacific.

35 Ralph Jennings, Increase in South China Sea Naval Activity Expected to Provoke Beijing, *Voice of America (VOA)*, August 27, 2021.

36 US, UK aircraft carriers lead show of naval might around South China Sea, *Radio Free Asia*, October 7, 2021.

the world and vis-à-vis China, and due to China's military buildup, Nye states that "For better and worse, we are locked in a "cooperative rivalry" with China that requires a strategy that can accomplish those two contradictory things – compete and cooperate – at the same time."[37] Nye suggests several moves and sums up: "Pessimists look at China's population size and economic growth rates and believe they will prevail. But if we treat our allies as assets, the combined military strength and economic wealth of Western-aligned democracies – the United States, Europe, Japan – will far exceed that of China well into this century."[38]

India, in addition to expanding its economic relations with the countries in the region, is promoting its main policy goal, which is to prevent China from dominating the region and blocking its own ascendant power in South Asia and the Indian Ocean, which are India's "backyard". Since India has an ongoing dispute with China over its Himalaya border, in addition to its desire to maintain trade and diplomatic relations, it employs a policy of "Evasive Balancing", meaning balancing while attempting to calm the target to believe that nothing is being done. "Evasive Balancing" includes a combination of balancing and calming elements.[39] To shore up this policy, India issues prolific diplomatic and other statements that it has no intention of restraining China and that it will not join any anti-China alliance. India's policy is in fact unclear, given the fact that it is a member of the QUAD alliance. Thus, it seems that India will not be able to persuade China that it has no hostile intentions while it will not be able to deliver on what its QUAD allies want of her.[40]

ASEAN countries have been in a problematic situation with China for many years. Most are closely tied to China economically, in particular Laos and Cambodia, which are almost Chinese proxy states. They are having difficulties choosing who to support in the long term and to whose bloc they should belong – the United States or China. It is highly likely that there will not be a clear-cut choice of one over the other and that they will maintain economic and diplomatic contacts concurrently with both sides. The conflict in the South China Sea also influences the Philippines, Malaysia, Indonesia and Vietnam, which are at a conflict of interests with China on a virtually daily basis. The continuation of the discussions regarding the Code of Conduct (COC)

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37 Joseph S. Nye, Jr., With China, a 'Cold War' Analogy Is Lazy and Dangerous, *New York Times*, November 2, 2021.

38 Ibid.

39 Raymond Ridderhof, Indo-Pacific Strategies, *Peace Palace Library*, 29 July 2021.

40 Ibid.

for the South China Sea might also be a contribution as the basis for naval vessels' behavior in the Indo-Pacific.

The European Union countries reached a significant decision on April 16, 2021 concerning the Indo-Pacific region. The first paragraph says:

> The Council considers that the EU should reinforce its strategic focus, presence and actions in the Indo-Pacific with the aim of contributing to the stability, security, prosperity and sustainable development of the region, based on the promotion of democracy, rule of law, human rights and international law.[41]

An explanatory document that was issued later stated that the region was gaining strategic importance to the EU's countries because of the growing economy, the demographics and political issues that were turning the region into a "key player" shaping the world order and posing global challenges. In its reasons for deciding on the strategy for collaboration between the European Union and the Indo-Pacific, it is emphasized that 70% of all global trade and over 60% of all Foreign Direct Investments are between these two regions.

The main components of the European Union's Indo-Pacific strategy will be increased engagement with an interest in maintaining the Indo-Pacific region free and open to all while building strong, long-lasting partnerships. The basic message is that the European Union is going to deepen its engagement with its Indo-Pacific partners in order to respond to the emerging dynamic, which has an effect on the regional stability. The European Union's approach is intended to cultivate an international order based on rules, a level playing field, and an open and fair environment for trade and investment, for coping with climate change and for supporting connectivity with the European Union.[42] The purpose of involving the European Union countries in the Indo-Pacific region is not to create conflict with China, but rather to create collaborations with any country willing to cooperate. At the same time the EU countries will work to build collaborations with China. The European Union countries already have various agreements with many countries in the region, including Thailand, Malaysia, Australia, New Zealand, India, Japan, South Korea, Singapore and others. The European Union countries will also work to safeguard freedom of navigation and maritime security through the presence of navy vessels along the region's shipping lanes.

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41 EU Strategy for cooperation in the Indo-Pacific – Council conclusions, 16 April 2021.

42 Questions and Answers: EU Strategy for Cooperation in the Indo-Pacific, 16 September 2021

Conclusion

Although China does not use the term "Indo-Pacific", and although it has not published any document on this issue, its behavior in realizing its maritime strategy, including the Belt and Road Initiative, has been ongoing for several decades now and has consistently been accomplishing one goal after another. It is highly doubtful that it will be possible to alter the situation in the South China Sea or to undo the "achievements" of China's Belt and Road Initiative and one of its key components of additional ports within the Indo-Pacific region, serving the Chinese Navy for refueling and maintenance. Neither will it be possible to roll back the scaling up of the Chinese Navy and the substantial improvement in its quality. China continues to claim it has no aggressive intentions nor that it has any desire to supplant the United States' hegemony in the Indo-Pacific region. President Xi, in his speech on October 25, 2021, said: "(The Chinese people) have always pursued an independent foreign policy of peace, upheld justice and resolutely opposed hegemonism and power politics".[43] He added that only the 193 United Nations member states can together draft international laws and obey them. According to President Xi, "China wants prosperity for all – not global hegemony".[44]

The United States is continuing to issue negative responses to China's behavior in the Indo-Pacific region. The Pentagon, on October 26, issued the following statement: "China continues to bully its neighbors to try to coerce them into behavior that is more in keeping with China's national security or economic interests. And we don't believe that this is conducive to a free and open Indo-Pacific".[45] And on the other hand the *South China Morning Post* reported that the United States had carried out 2000 espionage missions against China. "US ships and planes conducted 2,000 spying missions aimed at China this year, says military analyst".[46]

Paul Kennedy also testifies to the geostrategic situation: "Changes in global politics, armed forces and economics means America has a new contender for supremacy".[47]

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43 Danson Cheong, No one country or bloc can dictate global rules, says President Xi as China marks 50 years at UN, *The Straits Times*, October 25, 2021.

44 Tweed and Leung, "China Is Making a Bold Military Power Play".

45 Lalit K. Jha, "China continues to bully its neighbours, not conducive to free & open Indo-Pacific: Pentagon", *The Print,* October 26, 2021.

46 Liu Zhen, "US Ships and Planes Conducted 2,000 Spying Missions Aimed at China This Year, Says Military Analyst", *South China Morning Post*, October 28, 2021.

47 Paul Kennedy, "Paul Kennedy on whether China's rise means America's fall", *The Economist*, September 1, 2021.

The navies of the United States and its allies have, without a doubt, at the end of 2021, a technological advantage and are with better naval experience than the Chinese Navy (which in fact had never participated in significant naval combat). However, it is unclear that the outcome of a conflict between the American and Chinese navies would be clearly in favor of the United States and its allies. China has the ability to place a greater number of vessels armed with advanced armaments. Moreover, China is able to conduct military activities through its Naval Militia, which would position the conflict within the "gray zone", making it difficult for the United States and its allies' navies to respond.[48] As time passes, the relative advantage to the United States' forces, including that of its Navy, is diminishing. This raises questions: Will the United States be willing to invest the budget necessary for preserving its relative advantage? And what will happen if China on its part decides to invest whatever it takes to achieve a military advantage over the United States? This is in view of the steady growth of the Chinese economy, with its population of 1.4 billion citizens capable of generating huge budgets for its defense.[49] There is no doubt that a formidable, extremely dangerous adversary has arisen for the United States.

China's response to the increased naval activity includes, of course, official complaints, but it also includes intensification of the navy's activity and exercises demonstrating its power. In the Indian Ocean region, China is conducting intelligence patrols by submarine and surface ships. But it is highly unlikely that a clash or contact between the Chinese Navy and other navies will take place in the Indian Ocean; this possibility does however exist in the South China Sea.

On geostrategic and geopolitical issues, the Chinese are behaving in accordance with their ancient culture and traditions in mind. The Confucian and Sun Tsu doctrines are the basis. Among these rules of behavior is the practice of telling "polite lies".[50] There is no doubt that the Chinese leadership, as well as the media, use this practice as needed, when answering international entities and also for domestic policy purposes. This behavior sometimes leads to misunderstandings and even to awkwardness.

The activity of American forces, in particular freedom of navigation patrols and intelligence sorties of US Navy spy planes, and the joining of foreign navies for a show

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48 Tom O'Connor and Naveed Jamali, "As China Gray Zone Warfare Escalates, U.S. May Stand to Lose First Shooting Battle", *Newsweek*, March 4, 2021.

49 Kennedy, "Paul Kennedy on whether China's rise means America's fall".

50 This issue is discussed in the book entitled Lies That Bind: Chinese Truth, Other Truths by Susan D. Blum on the AMAZON website.

of force are extremely troubling to the Chinese authorities. The truth is that there is no infringement of the freedom of navigation, neither of naval ships and certainly not of merchant ships (China would be the first to suffer from any obstruction to the trade routes in the South China Sea), and the issue is being managed through exchanges of allegations and protests. Chinese aircraft and vessels are scrambled to track and warn, actions which might, should human error intervene, cause severe incidents. The continuation of the foreign activities and their intensification are, from the Chinese standpoint, provocations. And indeed, as part of a policy which in Western eyes appears very aggressive and provocative, China is continuing to develop and improve defense systems based on a strategy of "Offshore Balancing". The main problem is, apparently, that western countries, primarily the United States, conduct their activities vis-à-vis China based on western philosophy and culture, which defines methods of governance, of managing and making decisions – on a totally different basis than what is common in China. The very fact that China is designated as a Communist country, based on a supposedly Marxist-Leninist ideology, is in itself a barrier that places China in the enemy camp. Therefore, the approach to China should be modified: its history and traditions should be taken into consideration when these occur in their behavioral patterns. This approach is not being applied and the United States policy toward China nowadays is virtually unchanged from the Mao era.

The new strategic-technological agreement between Australia, the United Kingdom and the United States (AUKUS) is intended to enable them to prevail in the event that an armed conflict should break out. Using modern nuclear submarines will enable the said navies to operate in relative confidence, however only in another decade or two, in the regions of the South China Sea and the Straits of Taiwan, while surface ships will be less active since they will be subjected to the continuing threat of China's anti-ship missile systems.

Freedom of navigation, which is by no means diminished, is not China's main problem in the South China Sea. Issues such as the search for raw materials and energy and fishing are those which will underpin the dispute between China and its neighbors. There have already been incidents in which the Chinese Coast Guard and its Maritime Militia have attempted to stop fishing activities of neighboring countries and also to disrupt oil and gas drilling.

Graham Allison presents a more pessimistic position. He concludes that China and the United States are on a collision course leading to war even though neither of

them wants it. The reason is the Thucydides Trap.[51] Chinese President Xi Jinping and former US President Donald Trump promised to make their countries "Great Again". China, which is unstoppable, is gaining ground on a complacent United States and any mishap or misunderstanding or mistake in the Indo-Pacific region, and in particular in the South China Sea, can trigger armed conflict. Allison explains in his book why the Thucydides Trap is the lens through which the US-China relations must be understood in the twenty-first century. In order to prevent war, China has got to tone down its economic and political ambitions and the United States will apparently have to accept that fact that it is going to be relegated to the position of Number Two in the Indo-Pacific region.[52]

The situation can also be examined and referred to according to what Moeller wrote, "Beijing is not a systematic enemy. It wants to be part of the global system."[53]

US Deputy Secretary of Defense Kathleen Hicks, said at the Aspen Security Forum on April 30, 2021: "[…] Let there be no doubt, China presents a real and enduring challenge […] Despite concerns, diplomacy is important, and conflict with China is neither desirable nor inevitable […]".[54]

And Mark Valencia summed it up: "The US is putting the military cart before the diplomatic horse".[55]

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51 "It was the Athenian ascendancy and the fear this bred in Sparta, which made war inevitable". This sentence was written by Greek historian Thucydides, who was referring to the reason for the outbreak of the great war between Athens and Sparta in the fifth century BC. Thucydides believed that the rise in Athenian military and economic power created tensions in Sparta, which had been the regional power until then. This tension greatly increased the likelihood of conflict and all that was necessary was a small spark to touch off a firestorm. The match came in the form of a conflict between two second-tier city-states, Korinthos and Kerkira (Corfu), which dragged Athens and Sparta into a 30-year war that shattered Greece and laid it exposed to outside invaders. Ofir Dor, "The Powers' Trap: What Is the Connection between the Sparta-Athens War and the China-US Tensions?" *Calcalist,* August 11, 2017 [Hebrew]. The article reviews Graham Allison, *Destined for War: Can American and China Escape Thucydides's Trap?* Boston: Houghton Mifflin Harcourt, 2017.

52 Graham Allison, *Destined for War: Can American and China Escape Thucydides's Trap?* Boston: Houghton Mifflin Harcourt, 2017.

53 J. O. Moeller, "Global Power Puzzle: Why China's Rise Doesn't Cause a Problem, *The National Interest*, September 10, 2021.

54 David Vergun, "Deputy Defense Secretary Says Conflict with China Is Not Inevitable", *Department of Defense News*, April 30, 2021.

55 Mark J. Valencia, "South China Sea: the US is putting the military cart before the diplomatic horse", *South China Morning Post*, September 17, 2021.

If we also take into consideration Paul Kennedy's words, then it is almost certain that under any circumstances, diplomacy is preferable to military action and it is possible that agreement on a Code of Conduct, which is being discussed in protracted meetings between ASEAN countries and China, with all its drawbacks, is the only solution.

Although Israel is far from the dynamic Indo-Pacific region, it is nevertheless important both to its national economy and security. Israel has good trade and diplomatic relations with some of the countries in the region, mainly India, South Korea and others. A large proportion of the trade with the countries in the Far East passes through the Indo-Pacific shipping lanes. The new relations with some of the Persian Gulf countries also involve maritime transportation of energy and other commodities. And most importantly, Iran, which still seeks to annihilate Israel, is, and apparently will continue, working against Israel including in the Arabian Sea and in the Straits of Bab el-Mandeb. Israel therefore has to carefully monitor developments in the region and be aware of the activities which might pose a strategic threat or problem on the part of hostile countries.

Russia and the Indian Ocean

Tzevy Mirkin

The Legacy

On the morning of March 24, 1801, the new Russian Emperor Alexander I, grandson of Catherine the Great, said in his first address to his subjects: "In my time everything is going to be as it was in my grandmother's days". The young Emperor directed these words at the aristocracy, which had regarded the Catherine era to be a golden age. This phrase – to rule as in erstwhile times, when life was better – has come up several times in Russia's history post-Alexander I. The last time this happened was in the 2000's, when Russia's President Vladimir Putin called the breakup of the Soviet Union "the greatest geopolitical disaster of the 20th century", and Russian propaganda began portraying the final decades of the Soviet Union, mostly under Leonid Brezhnev, as an almost golden era. One of the foremost symbols of that period was the Soviet military might, including its navy – which had not only shown its flag all over the vast expanses of the ocean, it had even tried to rival that of the United States.

Sea voyages and presence in the Indian Ocean during that period are portrayed as part of the "symbols of greatness", although in reality the Indian Ocean has, throughout history, played a very minor role in the Russian agenda. Indeed, access to India had interested the Russians and they even attempted to dent Britain's standing there, but all these activities, from the failed attempt to send forces to India in 1800 and culminating in the "Great Game" in the second half of the 19th century, were conducted overland. The Indian Ocean gained importance to the Russians only at the end of the 19th century, when it set up its naval forces in the Far East. The ships that made up the new fleet had been built in Baltic shipyards and their route to Port Arthur and Vladivostok passed through the Indian Ocean.

The Russo-Japanese War of 1904–1905 brought attention to the problematic nature of this route during war times. This was one of the main reasons why in the second half of the 1920's the Soviet government attempted to open a route linking the Barents Sea and Russian ports in the Pacific Ocean via the Arctic Ocean and Bering Strait. This route, which was named the Northern Sea Route, had several advantages which outweighed the difficulties of navigating it. The main advantage was the fact that it was completely within waters controlled by the Soviet Union. Although the Soviets also made use of the route passing via the Indian Ocean even after this northern route had been opened, including during the first decade of the Cold War, the Indian Ocean was not important to them.

The Soviet Union began showing renewed interest in the Indian Ocean during the second half of the 1960's, when US Navy nuclear submarines appeared there, equipped with Polaris ballistic missiles.[1] While Soviet diplomatic activity in this region began gaining momentum a decade earlier – following Soviet leader Nikita Khrushchev's strategic decision to ramp up relations with post-colonial states which had not declared themselves to be socialists[2] – this activity was virtually devoid of a military dimension. The Soviet Union provided weapons to friendly regimes and trained their armies, but it was loth to seek a direct presence in the sphere.

The situation changed once American strategic submarines appeared in the Indian Ocean. The Soviets perceived this development to be a direct and immediate threat which required urgent action. In 1971 the "8th Operational Squadron" was established and designated to operate in the Indian Ocean. The squadron was placed under the command of the Pacific Fleet. When the Squadron began operations, the Soviets were forced to deal with the problem of lack of onshore infrastructures. The arena was far away from the fleet's bases in the Pacific Ocean, which were located in the Soviet Far East, and the "Mobile Rear " method,[3] which had been developed precisely for such cases, failed to provide a full-scale solution for the needs of the squadron. Diplomats were assigned to the attempts to solve the problem. In 1971, the Soviet Union reached an agreement with South Yemen to establish a base for the 8th Squadron on the Sokotra Islands in the Arabian Sea.[4] At the same time, a naval base for a military communications center and facilities for aerial forces was

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1 G. Golan, *Soviet Policies in the Middle East from World War Two to Gorbachev*, (Cambridge: Cambridge University Press, 1990), p. 13.

2 "The summary report of the Central Committee of the Soviet Union for the Party's 20th convention: Speech by First Secretary of the Central Committee of the Communist Party of the USSR Comrade N. Khrushchev", from: the 20th convention of the Communist Party of the USSR, *14–25 February 1956: transcript*, (Moscow 1956), Vol. A pp. 24 ("Отчётный доклад Центрального Комитета Коммунистической Партии Советского Союза XX Съезду партии: Доклад Первого секретаря ЦК КПСС тов. Н.С. Хрущёва", in: XX Съезд Коммунистической Партии Советского Союза, 14-25 февраля 1956 г.: Стенографический отчёт, (Moscow, 1956), Vol. I, p. 24.

3 In the Armed Forces' lexicon of the Soviet Union and Russia, the word "rear " encapsulates a set of all of the combat support systems – maintenance, munitions, supplies etc. The "mobile rear" was an attempt to find a solution to the problem of lack of onshore infrastructures in the remote theaters, where the Soviet fleet was operating. Its main thrust was that all of the support for the warships operating in the arena was assigned to the support vessels which were seconded to the squadrons.

4 A. Usikov, and V. Yeremenko, "Fleet as a Tool of Policy", *Independent Military Coverage*, August 29, 2003 (Усиков, А., Яременко, В. "Флот как инструмент политики", in: Независимое военное обозрение, 29 авг. 2003 года)

being constructed in Berbera, Somalia. These bases quickly became the center of the Soviet naval activities in the Indian Ocean.[5] In 1977, the geograph ic extension of the Soviet fleet's facilities in the region was expanded to Ethiopia, where a new regime came to power and declared itself to be Marxist. The Soviet Union was given the opportunity to build a naval base on the Dahlak Archipelago in the Red Sea.[6] However, that year, additional changes took place. Following an outbreak of hostilities between two of the Soviet Union's allies, Somalia and Ethiopia, the Soviets chose to back Ethiopia, following which Somalian President Mohammed Siad Barre expelled the Soviet military personnel from his country. The void left with the closure of the Berbera Naval Base was filled by South Yemen, which allowed the Soviets to use the Port of Aden.[7]

These moves solved, even if only partially, the issue of bases within the theatre, however the problem of support for the fleet's vessels en route from Vladivostok to the Indian Ocean still remained, since it passed through regions under the control of the American naval forces stationed in Subic Bay, Philippines. The solution was found in Vietnam, which was in need of Soviet support following its war with China in early 1979. A Soviet base was established in 1980 in the city of Cam Ranh in Vietnam, where warships and auxiliary vessels were stationed. These became the "17th Operational Fleet", plus bombers and reconnaissance planes of the Fleet's aerial forces in the Pacific Ocean.[8]

The Soviet naval activity in the Indian Ocean had a very clear strategic purpose, however it had an extra dimension related to the internal machinations within the top Soviet military ranks. For approximately 30 years, from the late 1950's until the late 1980's, the command of the Soviet navy fought for its status within the armed forces. Ever since its establishment at the end of the 17th century, the Russian navy, and later the Soviet navy, was relegated only to a supporting role within the armed forces. According to the analysis of British Admiral Julian Oswald, who in the early 1990's was the head of the British Royal Navy, the main feature of the Soviet navy,

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5 A. E. Graham, "Soviet Strategy and Policy in the Indian Ocean", in: P. J. Murphy (ed.), *Naval Power in Soviet Policy*, Washington (D.C.: U.S. Government Print Office, 1978), p. 284.

6 I. Kapitanetz, *In the Service of the Ocean Fleet, 1946–1992: Notes of a Commander of Two Fleets*, (Moscow, 2000), p. 692 (Капитанец, И.М. На службе океанскому флоту*, 1946–1992:* Записки командующего двумя флотами*, (*Москва*, 2000),* p. 692).

7 A. E. Graham, "Soviet Strategy and Policy in the Indian Ocean", in: Murphy, P.J. (ed.) *Naval Power in Soviet Policy*, (Washington, D.C., 1978), p. 285.

8 *Soviet Air and Naval Presence at Cam Ranh Bay, Vietnam*, July 1984, (CIA FOIA Electronic Reading Room, Doc. No. ESDN (CREST): CIA-RDP91T01115R000100190002-3), p. 13.

and later the Russian navy, was the fact of its being a "naval a ppendage" of the ground forces, managed by ground-force generals in the General Staff.[9] The Indian Ocean (together with the Atlantic Ocean, to a degree) was the theatre in which the navy operated exclusively, a fact which enabled it to "raise its profile" and demand not only to have its status upgraded, but also to increase its share in the budgets and resources allocated to the armed forces.

The Post-Soviet Era

Following the disintegration of the Soviet Union, the Russian Navy discontinued its operations in the Indian Ocean. Although the base at Cam Ranh continued operations for a decade longer, until it was finally closed in 2002, sailing into the arena ceased throughout the 1990s. The change, albeit low-key, began in the early 2000's. On March 4, 2000, then Acting President Vladimir Putin[10] signed an order instructing the raising of the level of activity in the maritime domain. Following this order, a first voyage of naval vessels took place into the Indian Ocean between January and March 2001. The force consisted of two frigates and a tanker.[11]

An actual ratcheting up of Russia's naval activity in the Indian Ocean occurred several years later when it joined the international effort to fight piracy around the Horn of Africa. This required the Russians not only to use the Pacific Fleet, but in fact all of their fleets. Ships from the Northern and Baltic fleets were also sent to the region on "operative missions".[12] The reason for that was the desire on the part of the naval high command to provide active practice for as many ships as possible after a long period in which Russian war ships had scarcely ventured into the high seas, but, apparently another reason was the inability of any one of the fleets to accomplish this mission single-handedly following the drastic reduction in the order of battle.

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9 J. Oswald, "The Soviet Navy – a Western View", *The RUSI Journal*, 141(4) (1996), pp. 45–47.

10 Putin rose to power in December 31, 1999 following the resignation of his predecessor Boris Yeltsin. However, until he was officially elected to the presidency on March 26, 2000, his status remained "Acting President".

11 I. Safronov, and A. Chernishov. "The Russian Fleet Returns to the Indian Ocean after a Nine-Year Hiatus", From: *Commersant*, January 16, 2001 (Сафронов, И. Чернышов, А. "Российский флот возвращается в Индийский океан после девятилетнего перерыва", Коммерсант, 16 января 2001 года).

12 About the activity of the Russian naval forces against the pirates, see "Somalian pirates encounter the Neustrashimy for the first time (*RIAN*, 12 November, 2008) ("Сомалийские пираты впервые столкнулись с "Неустрашимым", РИАН, 12 ноября 2008 года) and "Pirates Withdraw in the Face of Russian Sailors", (Interfax, 3 August, 2010) ("Пираты спасовали перед российскими моряками", Интерфакс, 3 августа 2010 года).

Moscow's interest in the Indian Ocean was rekindled several years later. A trickle of voyages to the region began in 2017, followed by the Russian navy beginning to take part in naval maneuvers with the countries in the region. At the end of 2019 and early 2020, a joint naval maneuver was held in the Gulf of Oman involving Russia, Iran and China. On the Russian side, a task force from the Baltic fleet participated. It consisted of a frigate, a tanker and a tug boat.[13] Another joint Russian-Iranian maneuver took place In February 2021 in the Gulf of Oman and in the northwestern part of the Indian Ocean. The Russians sent a corvette and a tanker from the Baltic fleet.[14]

At the same time, the Russian fleet is conducting joint maneuvers with the Indian Navy. In December 2019, a task force from the Baltic Fleet (in a usual configuration – frigate, tugboat and tanker) took part in an Indian Navy maneuver,[15] and in September 2020 there was another joint Russian-Indian naval maneuver in the Gulf of Bengal.[16]

Attempts are also being made to continue with voyages into the region – thus, in the final months of 2020, a task force of the Baltic Fleet sailed into the Indian Ocean. The force consisted of three vessels – a frigate, a tugboat and a tanker.[17]

The Russian navy 's level of activity has been relatively high in recent years, both when compared with the activity in other arenas, and when taking into consideration that this is branch of the military with very limited capabilities, where almost any foray into remote arenas is a significant event. This being said, the Indian Ocean arena has received only brief mention in Russia's "maritime doctrine". This theatre is

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13 Russia, PRC and Iran hold their first joint maneuver in the Indian Ocean, Deutsche Welle, 27 December, 2019 ("РФ, КНР и Иран впервые проводят совместные учения в Индийском океане", Deutsche Welle, 27 декабря 2019 года.

14 "A clear signal": Russia and Iran practice defense in the Indian Ocean" ("Ясный сигнал": Россия и Иран отрабатывают оборону в Индийском океане), (*gazeta.ru*, 16 February, 2021).

15 "In India the maritime part of the Indra 2019 maneuver has begun" ("В Индии началась морская часть учения Индра-2019"), (*RIAN*, 11 December 2019).

16 "The Indra Navy-2020 maritime maneuver has ended in the Bay of Bengal" ("В Бенгальском заливе завершилось российско-индийское военно-морское учение Индра Нэйви-2020"), *Russian Defense Ministry website*, 6 September 2020.

17 Formation of Baltic Fleet vessels departs en route to the Indian Ocean", *RIAN*, 1 October 2020 ("Отряд кораблей Балтийского флота отправился в поход в Индийский Океан", РИАН, 1 октября 2020 года).

noted there as one of the "main regional directions of the Russian maritime policy",[18] however since all four oceans are mentioned in this list of directions, the mention itself is in fact meaningless. The real importance of the Indian Ocean is apparent also from the length of the reference to it is in the "Doctrine" – its authors devoted half a page to this theatre (whereas, for example, almost two pages are devoted to the Caspian Sea). Besides the general statements (such as "the importance of developing Russian shipping in the Indian Ocean", "aspiration to extract oil from it in collaboration with other countries in the region" and "guaranteeing a presence for the Russian Navy there"), only one clear goal is mentioned – use of the maritime activity in the Indian Ocean to develop friendly relations with India.[19]

The theatre failed to gain any special reference in the ordinance "On the fundamentals of the naval policy", which was signed by President Putin in the summer of 2017. The Indian Ocean is only mentioned there as one of the theatres in which the presence of the Russian Navy is necessary due to the increase in piracy.[20] "Russia's national security strategy", which was approved in July 2021, makes no mention whatsoever of the Indian Ocean theatre (and in general, the reference there to maritime activity is noticeably low-key).[21]

To all appearances, this situation seems to indicate a contradiction between Russia's declared policy in the theatre and its policy in practice. This contradiction became all the more acute in autumn 2020, when Russia announced that it had reached an agreement with the Sudanese government to set up a Russian naval base in that country. According to Russian publications, the number of Russian citizens allowed to be stationed at the base was limited to 300 individuals, and the number of vessels that will be allowed to dock there concurrently is limited to four. It was noted that nuclear-powered vessels would be allowed to dock at the base.[22] On 16 November

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18 Maritime doctrine of the Russian Federation from 2015, section 50, (Internet website of the Russian President).

19 Maritime doctrine of the Russian Federation from 2015, section 68.

20 "Fundamentals of the Russian Federation's policy in the area of maritime-military activity", approved by decree of the Russian President, 20 July, 2017, chapter 27, section 4, posted on the official website of the Russian President.

21 "The national security strategy of the Russian Federation", 2 July 2021, posted on the official website of the Russian President.

22 A. Achtirko, "Economic assistance in return for a Red Sea base: Sudan details the terms for stationing a Naval base", (gazeta.ru, 12 September 2021) (Ахтырко, А. "Экономическая помощь в обмен на военную базу на Красном море: В Судане рассказали, на каких условиях готовы разместить базу ВМФ").

2020, President Putin signed the presidential decree authorizing Russia's minister of defense to sign an agreement with Sudan regarding the construction of a "Logistic Support Facility" of the navy in Sudan.[23] Russian media responded to this with the usual fanfare and declared, "Russia returns to the Indian Ocean".[24] However, this plan never materialized. The Sudanese government hurriedly reversed its agreement with the Russians and it is now unclear whether the facility will be built at all.

Conclusion

In principle, Russia does not have any special interests in the Indian Ocean, and reference to the ocean in official doctrinaire documents reflects this. Neither are Russian corporations developing large-scale projects which would have necessitated increasing its military presence on the Indian Ocean's shores. In contrast to the Cold War days, there is no strategic threat to Russia that would justify a permanent presence of Russian forces there.

It may be that the maritime activity related to the Indian Ocean is driven primarily by the principle of "competing with the West", which was adopted by the Russian leadership in recent years, and from the ambition to "show a flag" wherever there is a western military presence. At the same time, this is a token presence only, since the Russian Navy's order of battle does not allow it to maintain a permanent presence in multiple remote arenas simultaneously. The use of naval forces as part of the diplomatic efforts vis-à-vis Iran, China and India seems more like a byproduct of this activity, since the naval collaboration is a completely secondary area in the relations between Russia and these countries.

The activity in the Indian Ocean is also consistent with the interests of the navy's high-command, since it enables it to present independent activity, in which the navy is not subject to other branches (as opposed, for example, to the activity in Syria,

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23 "Decree from the President of the Russian Federation to sign an agreement between the Russian Federation and the Republic of Sudan regarding the construction of a logistic support facility for the Russian Federation's Navy on the territory of the Republic of Sudan" 16 November 2020 (Распоряжение Президента Российской Федерации о подписании соглашения между Российской Федерацией и Республикой Судан о создании пункта материально-технического обеспечения Военно-Морского Флота Российской Федерации на территории Республики Судан от 16 ноября 2020 года"), Official legal information website.

24 See, for example: A.Kupryanov, "Wandering in Africa – what will Russia gain from a military presence on the Indian Ocean shores: Navy to get a base in Port Sudan", *Izvestia*, 16 November 2020 (Куприянов, А. "В Африку гулять – что даст России военное присутствие на берегах Индийского океана: Флот получит место для базирования в Порт-Судане", Известия, 16 ноября 2020 года).

where the deciding factor is the Air and Space forces, whereas the naval forces fulfill a supporting role). In addition, this activity represents a return, albeit a symbolic one, to the days of the "g lorious past" where the Soviet navy, the breeding ground where the majority of Russia's present-day admirals began their service, was considered to be a strategic force.

The US "Pivot" to East Asia: Potential Implications for the East Mediterranean If It Were Implemented

Ziv Rubinovitz

In late 2011 and early 2012, the Obama administration announced its "Rebalancing" (commonly labeled "Pivot") strategy toward East Asia.[1] Its intention was to concentrate US forces in East Asia and specifically in the South China Sea in order to balance China's rise, that is, containing it and reassuring US allies in China's vicinity.[2] Michael Mandelbaum spells out the "Pivot's" link to the Middle East: "America would devote greater attention and resources to Asia and, by implication, less of both to the Middle East."[3] However, this seems to have remained an unfulfilled intention at the time of writing (November 2021). While its attention has tilted toward East Asia, the United States cannot ignore events in the Middle East, therefore it cannot fully pivot. The August 2021 withdrawal from Afghanistan and a renewed nuclear deal with Iran – if one is attainable – serve the cause of pivoting to East Asia. Nevertheless, the Biden administration has been floating this issue more than the Trump administration had (with whatever terminology each administration used to refer to this issue).[4] The final withdrawal of US troops from Afghanistan in August 2021 and the new tripartite alliance with the United Kingdom and Australia from September 2021 can be viewed as indications in this direction.[5] The 2015 Joint Comprehensive Plan of Action (JCPOA, commonly known as the Iran Nuclear Deal)

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1 Hillary Clinton, "America's Pacific Century," *Foreign Polcy*, October 11, 2011; "Sustaining U.S. Global Leadership: Priorities for 21st Century Defense", January 5, 2012.

2 William Mayborn, "The Pivot to Asia: The Persistent Logics of Geopolitics and the Rise of China," *Journal of Military and Strategic Studies* 15, no. 4 (2014): 76–101; Michael Lumbers, "Whither the Pivot? Alternative U.S. Strategies for Responding to China's Rise," *Comparative Strategy* 34, no. 4 (2015): 311–329; G. John Ikenberry, "From Hegemony to the Balance of Power: The Rise of China and American Grand Strategy in East Asia," *International Journal of Korean Unification Studies* 23, no. 2 (2014): 41–63. One of the planners of the strategy, Janine Davidson, debunks some of the common myths, as she calls them, concerning the strategy, including its nature as a pivot, which implies pivoting away from other regions. Janine Davidson, "The U.S. 'Pivot to Asia,'" *American Journal of Chinese Studies* 21, special issue (June 2014): 77–82.

3 Michael Mandelbaum, *Mission Failure: America and the World in the Post-Cold War Era* (New York: Oxford University Press, 2016), 351.

4 Michal Kolmaš and Šárka Kolmašová, "A 'Pivot' that Never Existed: America's Asian Strategy under Obama and Trump," *Cambridge Review of International Affairs* 32, no. 1 (2019): 61–79.

5 Greg Myre, "Long Promised and Often Delayed, the 'Pivot to Asia' Takes Shape under Biden," NPR, October 6, 2021. See also Elise Labott, "Can Biden Finally Put the Middle East in Check and Pivot Already?" *Foreign Policy*, March 2, 2021.

can also be seen as part of the effort to abate tensions in the Middle East and lay the infrastructure for a more orderly region, allowing the United States to redeploy military forces to East Asia. Thus, the question is if the United States is seriously preparing to pivot toward East Asia and how this would impact the Middle East. This article focuses on the naval arena, and therefore looks at how the pivot might affect security in the Mediterranean Sea and impact US regional allies.

The United States' presence in the Mediterranean Sea goes back to the 1950s, after the decline of the British Empire and its naval power. Ever since, the United States has been the dominant naval power in the region and its Sixth Fleet is permanently deployed in the Mediterranean. This is both a power-projection action and a reassuring feat for all users of the sea lanes—particularly US allies—that the United States defends free navigation, provides general security on the high seas, and protects the shipping of oil to the West and to the United States itself, although this latter issue is far less significant in recent years. The Sixth Fleet had regularly been visiting ports of friendly countries for services and a show of a (friendly) flag. Since 1979, it had visited Israel's Haifa Port numerous times.[6]

The possible redeployment to East Asia would include the US naval forces. This raises questions about the future defense of the Mediterranean Sea and more broadly, raises concerns of US allies about future relations, especially in the defense realm. This seems to be exacerbated by the growing involvement of China in the region, including in ports, which alarms the United States.[7] The US-China rivalry is becoming very real in the Mediterranean Sea. In Israel, the new port in the Haifa harbor is run by a Chinese company and the United States limited the Sixth Fleet's visits to the Haifa port due to its concerns with a Chinese presence so close to their vessels.[8]

China's rise has been steady since the early 1990s. The US administrations since then—Bush 41, Clinton, Bush 43, Obama, Trump, and Biden—have been deeply concerned with China's growing power and influence.[9] The great concern has been

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6 Moshe Gotter, "Haifa: Action to Return Sixth Fleet Sailors", *ynet*, November 9, 2003 (Hebrew).

7 Natan Sachs and Kevin Huggard, "Israel and the Middle East amid U.S.-China Competition," Brookings Institution, July 20, 2020.

8 Ehud Gonen, *Geo-strategic Aspects in the Operation of the "Chinese" Port in Haifa* (Haifa: Chaikin Chair in Geostrategy, 2020), 22–23 (Hebrew).

9 For instance, Robert J. Art, "The United States and the Rise of China: Implications for the Long Haul," *Political Science Quarterly* 125, no. 3 (2010): 359–391; Aaron L. Friedberg, "The Future of U.S.-China Relations: Is Conflict Inevitable?" *International Security* 30, no. 2 (2005): 7–45; Christopher Layne, "A House of Cards: American Strategy toward China," *World Policy Journal* 14, no. 3 (1997): 77–95; Michael Beckley, "China's Century? Why America's Edge Will Endure,"

that China would surpass the United States as the largest economy in the world, which indeed is happening. But the issue with China is not merely economic. Economic power allows countries to invest in their militaries, and with their growing military and economic power, such countries would increase their influence in their regions—becoming regional hegemons if they are not stopped—and then beyond their immediate region, becoming global powers.[10] China is no exception, and the United States has detected its rise as most threatening to the US hegemony.[11] Thus, it was logical for Washington to plan to shift its military attention toward China in order to contain it.[12]

The Pivot was the result of several mostly unrelated processes: China's continuous rise in power, which needed to be addressed; the growing US energy independence that devalued the Middle East in Washington's mind; the general fatigue of the US population with combat in the Middle East that made this policy popular; and the need to invest more time and money on domestic issues by avoiding Middle Eastern affairs as much as possible. The Pivot strategy appears to focus US attention on what really matters to its global standing, as well as shift its attention away from less than critical matters at this time.

However, shifting forces to East Asia has to come at the expense of other regions with permanent US presence and engagement. The Mediterranean Sea is one of these regions, and is perhaps the most sensitive due to its unpredictability. A US withdrawal from anywhere—a country or a region—creates a power vacuum that

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International Security 36, no. 3 (2011–12): 41–78; Stephen G. Brooks and William C. Wohlforth, "The Once and Future Superpower: Why China Won't Overtake the United States" *Foreign Affairs* 95, no. 3 (2016): 91–104.

10 Paul Kennedy made the powerful argument that links economic growth with military buildup. Paul Kennedy, *The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500 to 2000* (New York: Random House, 1987).

11 John J. Mearsheimer, "The Gathering Storm: China's Challenge to US Power in Asia," *Chinese Journal of International Politics* 3 (2010): 381–396.

12 There is a scholarly debate regarding the prospects of war between the United States and China. A leading scholar who argues that it is inevitable is Graham Allison, *Destined for War: Can America and China Escape Thucydides's Trap?* (Boston: Houghton Mifflin Harcourt, 2017). Among those who argue such a war is avoidable are Friedberg, "The Future of U.S.-China Relations"; Joshua Shifrinson, "The Rise of China, Balance of Power Theory and US National Security: Reasons for Optimism?" *Journal of Strategic Studies* 43, no. 2 (2020): 175–216. For recent discussions of the Sino-American conflict, see Hal Brands and John Lewis Gaddis, "The New Cold War: America, China, and the Echoes of History," *Foreign Affairs* 100, no. 6 (2021): 10–20; Peter Rudolf, "The Sino-American World Conflict," *Survival* 63, no. 2 (2021): 87–114; Dominic Tierney, "The Future of Sino-U.S. Proxy War," *Texas National Security Review* 4, no. 2 (2021): 49–73.

cannot remain unfilled. Obviously, in a volatile region like the Middle East, this is highly risky. The players that could potentially fill the vacuum are all hostile to US interests and US allies. Therefore, the fact that the United States had yet to pull out most of its forces comes as no surprise. Nevertheless, at least some regional instability already exists because of the Pivot strategy. The most important US allies in the Middle East—Israel, Turkey, Saudi Arabia, and Egypt—have all been wary of the Pivot since its announcement a decade ago. All rely on the United States for their security. All have an interest in keeping the US forces close by, thus their concern with the Pivot strategy is sensible.

The discussion about redeploying to the Asia-Pacific had already caused these allies to think of their future alignment because they understood that the United States was losing interest in the Middle East. [13] This can partly explain the rapprochement between several of the US allies in recent years, including Israel and Saudi Arabia and even Israel and Turkey recently. The Israeli-Saudi tacit relations apparently emerged due to their concerns with Iran's nuclear program, but could include additional aspects.[14]

The vacuum that a US withdrawal would create could be filled by several powers, all hostile to the United States and its interests. The first is Russia that had already returned to the Middle East because of the civil war in Syria.[15] It had reestablished its naval presence in the Eastern Mediterranean, although it is far inferior to the United States' navy, but with the greatest motivation among the great powers to increase its influence. The second is China, as part of its growing impact across the globe, and in this case, in Arab countries as well as in Israel. However, the Chinese navy is not present in the region and would likely be blocked by the United States from coming near the region. Russia would also prefer not to have China challenging it in the region. The third power is Iran, the rising regional power that had already established a strong footprint in Iraq, Syria, and Lebanon and its navy had already

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13 For a detailed analysis of the US Middle East policy since 2009, see Brandon Friedman, "US Engagement and Disengagement in the Middle East: Paradox and Perception," *Strategic Assessment* 24, no. 1 (2021): 136–153.

14 See Omri Eilat's article in this volume about the Turkey-Israel possible rapprochement. On the Israeli-Saudi relations, see Jacob Abadi, "Saudi Arabia's Rapprochement with Israel: The National Security Imperatives," *Middle Eastern Studies* 55, no. 3 (2019): 433–449; Jonathan Rynhold and Michal Yaari, "The Transformation of Saudi-Israeli Relations," *Israel Affairs* 26, no. 6 (2020): 799–818.

15 Samuel Charap, "Russia, Syria and the Doctrine of Intervention," *Survival* 55, no. 1 (2013): 35–41; Vassilis Kappis. "The Bear Learns to Swim: Russia's Re-Emergence in the Mediterranean," *Eastern Mediterranean Geopolitical Review* 2 (2016): 29–49.

been in the Eastern Mediterranean in recent years and is going through a significant buildup.[16] Obviously, Iran would be the most hostile to US regional allies and would be more concerning than Russia or China, thus it might encounter strong opposition from its regional rivals. Alternatively, these US regional allies—particularly the moderate Sunni countries—might opt for a rapprochement with Iran if they do not sense that the United States has their backs. There are several signs that this is already occurring.[17]

Ten years since the Pivot was announced, the US withdrawal from the Middle East seems on the one hand not going to happen because of the abovementioned concerns, while on the other hand, the growing power of China in the East Asian theater increases the pressure to balance it with additional US forces that most likely need to come from the Middle East. This would include Navy vessels. It is impossible to disconnect the land and sea arenas, but focusing on the sea, a US withdrawal or redeployment of naval forces, even if partial, will open the Mediterranean to serious competition that will have impact on the naval security of all the countries in the region. Russia would likely benefit most as it is already present in the Mediterranean. At this time, and despite its investment in its navy, China does not seem to have a powerful enough navy to attempt to take over the Mediterranean; nevertheless, at least hypothetically, if the United States withdraws and China senses that its maritime trade is not safe, it might consider a permanent presence in the Mediterranean Sea. Moreover, and as unlikely as it currently seems, if China manages to dominate the South China Sea despite the heavy US naval deployment, its appetite could grow. And it is important to note that no other country could stand up to the Russians.

The key question is whether the United States views the Mediterranean Sea as important enough not to leave to Russia's domination. Thus far, the answer seems positive, but the growing pressure in the East—most recently the increasing tension between China and Taiwan that might flare into hostilities[18]—might force the US administration to make a hard decision with relatively short notice. The result could be disastrous to US allies and to the US standing in the region while it is not stable and war-prone. A massive rearmament of its allies could be a reasonable solution for the US dilemma. Having its most trusted allies supplied with state-of-the-art weaponry to secure their ability to take care of their own security and interests

16 On Iran's naval power, see Sholmo Guetta and Motti Elharar's article in this volume.

17 Zvi Bar'el, "Tehran-Riyadh Détente Could Mark the End for Israel's anti-Iran Coalition," *Haaretz*, October 14, 2021.

18 Sammy Westfall. "What's Behind Escalating China-Taiwan Tensions?" *Washington Post*, October 7, 2021.

could ease much of their wariness. To this, the United States can add understandings about how these allies could look out for US interests as well, thus entrusting in them some key matters. If so, the regional allies may be convinced that the United States might reduce its physical presence, but still has their backs. The alternative is that the allies would seek substitutes to the United States. Among the US allies, Israel might find it hardest to find one due to its heavy and longstanding dependence on the United States.

Meanwhile, Israel has only strengthened its ties with the United States military. In mid-January 2021, several days before President Joe Biden was inaugurated, the Trump administration decided to transfer Israel from the European Command (EUCOM) to the Central Command (CENTCOM), which geographically speaking is much more reasonable, making the Middle East arena more coherent for the US military strategy and planning.[19] And on 30 September 2021, while conducting his first working visit to Bahrain, Israeli foreign minister Yair Lapid visited the USS *Pearl Harbor* at the headquarters of the US Navy's Fifth Fleet and met with Vice Admiral Brad Cooper, Commander of the Naval Forces of CENTCOM's Fifth Fleet. He emphasized that the United States, Israel, and Bahrain have "similar interests in the region."[20] Several days later, Vice Admiral Cooper visited in Israel and met with senior officials, including Defense Minister Benny Gantz, Chief of Staff Lt. General Aviv Kohavi, and commander of the Israeli Navy, Vice Admiral David Saar Salama, who said that "[t]he Fifth Fleet […] is an important strategic partner of the [Israeli] Navy. The Fifth Fleet and its people are committed to the security of the State of Israel, and we are mutually committed to them." Cooper said, "Our commitment to Israel is unwavering and this visit highlighted the importance of our decades-long strategic relationship. The recent alignment of Israel to US Central Command opens new opportunities to deepen our naval ties and enhance regional maritime security and stability."[21]

Striking the right balance between the need to deploy more naval forces in East Asia while not deserting the Mediterranean Sea could be impossible for the United

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19 Assaf Orion and Udi Dekel, "Winds of Change: Israel Joins the US Central Command Area," *INSS Insight* no. 1432, January 20, 2021.

20 Times of Israel Staff, "Lapid's Visit to Bahrain Includes a Trip to a US Navy Base, Off Iran's Coast," *Times of Israel*, October 1, 2021.

21 Anna Ahronheim, "Head of US Navy's 5th Fleet Concludes Visit to Israel," *Jerusalem Post*, October 9, 2021.

States.[22] Being effective in fulfilling their operational missions in both arenas is easier said than done. It seems that the new US-UK-Australia alliance could assist the United States in maintaining sufficient numbers of vessels in the Indo-Pacific for containing China at this time. However, it might be harder to create a similar alliance in the Mediterranean with the regional actors, who have conflicting interests. Therefore, ten years since the Pivot was announced but not fully implemented, it can be assessed that the United States prefers not to leave the Mediterranean, and instead form a stronger alliance around China. How sustainable would such a strategy be? It is hard to tell.

[22] One idea of how to do this appears in David W. Barno, Nora Bensahel, and Travis Sharp. "Pivot but Hedge: A Strategy for Pivoting to Asia While Hedging in the Middle East," *Orbis* 56, no. 2 (2012): 158–176.

Section 2: The Maritime Domain – the regions close to Israel

The articles in this section focus on the Mediterranean Sea and the Red Sea and touch on the Arab Sea and the Persian Gulf. The articles discuss a variety of issues: the strengthening of Iran's naval branch; the Israel-Turkey relations between the recent era of confrontation and the present and future opportunities for cooperation; the Red Sea basin that experiences on its African side war and conflict while on its Asian side a mixture of war in Yemen and reconciliation among the Gulf States that impacts their attitude toward the Red Sea and East Africa; the role of the GCC members in the security of the Gulf of Aden and the Red Sea; and finally, an article dealing with military innovation that originates in the political echelon and not the military echelon, and demonstrates this on the Dolphin submarines that Germany supplied to Israel in the 1990s.

The Development of the Iranian Naval Branch in Recent Years and the Implications for Israel and the Middle Eastern Countries[1]

Shlomo Guetta and Motti Elharar

Introduction

Iran under the Islamic Revolutionary regime has in recent years been asserting itself as a regional power in the Middle East alongside two other regional powers – Egypt and Turkey. Considering itself a regional power, Iran is developing its naval power, relying on three complementary components: The Islamic Republic of Iran Navy (IRIN), the naval force of the Islamic Revolutionary Guards (IRGCN), and a fleet of commercial ships of the Iranian Islamic Republic, which is led by two companies: one is the Islamic Republic of Iran Shipping Company (IRISL), and the second is the National Iranian Tanker Company (NITC).

In the *Maritime Strategic Evaluation for Israel 2019/20*, there was a paper dealing with Iran's maritime policy against the backdrop of the "tanker war" which was raging in 2019.[2] This article reviews the developments that have taken place in the past two or three years in the Iranian naval arm, both in terms of the continued building of the naval force and in terms of operating the naval force, which is characterized, in our view, by a step up compared with previous years. This has serious implications for Israel and the other countries in the region.

Since the Islamic revolution in Iran more than 40 years ago, Iran had regarded the State of Israel, and more than once the worldwide Jewish diaspora, legitimate targets for violent hostilities, whether perpetrated directly by Iran or by its client terror organizations, which are backed financially and militarily by the Quds Force.

Israel and Iran do not share a land border and are thousands of kilometers away from each other. But at the same time, Iran has developed tentacles which enable it to threaten Israel directly, in addition to its ballistic missiles and the potential future nuclear threat that it is developing vigorously.

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1 The topic of the article is very dynamic. It reflects the situation at the time of writing in November 2021.

2 Shlomo Guetta, "Iran's Maritime Policy as Expressed in the 'Tankers War' of 2019", in Shaul Chorev and Ehud Gonen (eds.). *Maritime Strategic Evaluation for Israel 2019/20* (Haifa: Maritime Policy & Strategy Research Center, University of Haifa, 2020), pp 66–82.

Iran's ability to threaten and strike Israel today might materialize through its arsenal of long-range surface-to-surface missiles, through its range of UAV's and cruise missiles that can be launched from inside Iran's vast territory or from the territories of its proxy terrorist organizations, such as the Houthis in Yemen, Hezbollah in Lebanon, or from Iraqi or Syrian soil, through Shiite militias they have cultivated in recent years.

To these terrestrial/geographic territories, one must add the maritime arena, which enables Iran, through its naval arm, accessibility and coming closer to realizing its strategic goals in the Middle East, including against the State of Israel. Iran's maritime access to the Middle East allows it to provide logistic aid to countries and organizations it supports, and in the future, this could allow Iran to close the "ring of fire" around Israel: Lebanon and Syria in the north, Iraq and Iran in the east, Yemen and the Gaza Strip in the south, and the Mediterranean Sea in the west.

Iran's strategic ambitions as a regional power have expanded and intensified in recent years due to its concerns over its isolation, due to the stinging sanctions imposed on it, especially during the presidency of Donald Trump.

To address these challenges and threats against it, the Iranian regime regards the naval arm, with all its different components, meaning IRIN, IRGCN and the civilian shipping, as entities which on the one hand will have defensive capabilities and ability to respond to threats against the Islamic Republic and its proxies – and on the other hand, it will possess offensive capabilities in order to pose a counter-threat toward those trying to thwart it and whittle down its strategic ambitions. In addition, the naval branch allows Iran to bypass the isolation and the sanctions regime.

In other words, the Iranian regime considers its naval branch capable of pursuing both defensive and offensive goals. This is why Iran has in recent years been investing considerable resources both in building the force and in using the force of its naval branch. Besides this, it is evident that in recent years, Iran is using its navy to advance "naval diplomacy" in order to deepen its bilateral ties throughout the region and the world, particularly during this period of intensified sanctions against it on the part of the West, and first and foremost the United States.

Building the Iranian Naval Force

The Iranian naval branch includes two main military components: The Iranian Navy (IRIN) and the naval force of the Iranian Revolutionary Guard (IRGCN). The importance of both forces is recognized by the regime and complement each other in terms of

the designation and the missions, despite competition and occasionally even rivalry between them in the past. It appears that in recent years the two components have been joining forces and cooperating, apparently under the guidance of the Supreme Leader Khamenei.

Iran's security industry highly prioritizes procurement and arming of these two naval components. Local building of navy ships, conversion of civilian ships for military uses, development and manufacture of weapons in a broad range of types and configurations, with emphasis on the manufacture of seaborne missiles, UAVs, both for attacking and for intelligence gathering, naval weapon systems, armaments and weapons including for special forces such as Marine Commando and frogmen.

Iranian Navy (IRIN) Force Building

In the past four years (from November 2017 to August 2021), Admiral Hossein Khanzadi commanded the Iranian Navy, having replaced his predecessor Admiral Habibollah Sayyari, who served as Navy Commander for ten years. Khanzadi has now been promoted to the role of Associate Commander of the Iranian Army.

Figure 1: Admiral Hossein Khanzadi

Like his predecessor, Admiral Khanzadi has continued, over his four years in the office, to work intensively to advance the building of the naval force thanks to the strong support and considerable resources being allocated by the Supreme Leader

Ali Khamenei and the rest of the security elite. Khamenei sees extreme importance in the maritime medium. Khamenei values the maritime domain and regards it to be a space which can add to Iran's deterrent and augment its expansionist ambitions. In his view, Iran's naval capability has to include defensive and offensive dimensions. Khamenei and the rest of the political and military leadership in Iran regard the upgrading of the Iranian Navy's capabilities to be another important building block in the transformation of Iran into a regional power.[3]

In accordance with this strategy, as opposed to the past, where the navy operated in the shadow of the naval force of the Revolutionary Guard, it is becoming apparent that in recent years it is being prioritized and is also receiving resources and attention from the local military industry. In addition to the previous (mostly obsolete) naval order of battle at the disposal of the navy ever since the Shah's rule, the navy is now in the midst of an impressive feverish process of increasing its strength. This includes:

- A future plan to independently build multi-purpose missile destroyers, with a displacement of over 5,000 tons as part of a project codenamed Nagin (gemstone).[4] At the moment it is unclear what the project status is and when the first destroyer will be handed over to the Iranian Navy
- Construction of a series of missile frigates, of the *Moudge* class,[5] with a displacement of approximately 1,500 tons, based on the British frigate MAEK-5 (Vosper Shipyards), which was built and delivered to the Iranian Navy during the reign of the Shah. The first frigate of the new model is named *Jamaran*. So far four frigates of this model[6] have been completed and three additional frigates of the same class are expected to be built, where their main armament is going to be sea-to-sea missiles, apparently with a range in excess of 300 km and with the ability to carry a Naval helicopter

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3 Omer Dostri, The Iranian Naval Threat: Meanings and implications for Israeli and regional security, Jerusalem Institute for Strategy and Security, June 17, 2019 [Hebrew].

4 Interview with Admiral Khanzadi, "Navy plans to build destroyer with over 5,000 tons", *Tehran Times*, November 24, 2019.

5 In early December 2021, one of the frigates of this model that was constructed at Bandar Abbas turned on its side and was damaged. One person was reported dead in the incident. About the construction of frigates of the MOWJ class, see a review by H. I. Sutton, "Iran's latest Mowj Class warship: IRIS Dena", *Covert Shores*, January 1, 2021.

6 One of the frigates from this series, the *Damavand*, was damaged in an accident in the Caspian Sea, underwent repairs and was returned to service.

Figure 2: The Frigate Jamaran, of the Moudge class

- **Submarines**: The Iranian Navy has three strike submarines of the *KILLO* class (displacement of approximately 3,000 tons), made in Russia and supplied at the end of the 1980s and early 1990s. Their current technical and operational serviceability is unknown. At least one of them, the *Taregh*, was upgraded in recent years to be able to launch sea-to-sea missiles, manufactured in Iran. In the first half of November a major naval exercise (Zulfiqar-1400) took place and this submarine participated and even launched a naval missile.
- Meanwhile Iran has developed, apparently with North Korean assistance, several midget submarines – mainly of the *Ghadir* class (with a displacement of approximately 125 tons)

During the second half of the 2010s, Iran began building a *Fateh* class submarine (600 tons displacement), which has been completed and has been commissioned for operational service in 2019. It is unclear just how successful this project has been and to what extent this serves as an opening for Iran to independently continue to develop and build submarines in the order of 600 tons and above. An analyst specializing in the Iranian naval component estimates that the building of the *Fateh* class is a first step toward self-building of larger submarines.[7]

Figure 3: Fateh-class coastal submarine

7 H. I. Sutton, "Iranian Navy's Fateh Class Submarine Explained", *Covert Shores*, September 16, 2020.

- In October 2021, the Iranian Chief of Staff General Bakri paid a visit to Russia, during which he was also hosted by the Russian Navy in St. Petersburg. It has been reported that the main purpose of the visit was to conclude a large naval procurement deal between Russia and Iran, which would include ships and weapon systems. In this report the possibility was raised – though, this could not be verified – that this new deal will include the purchase of submarines and missile ships. China, too, has good potential to provide Iran with naval ships and weapons. In the past it has even done so, when it granted Iran a license to produce marine missiles of various kinds.
- The Iranian Navy's order of battle incudes additional kinds of weaponry, including missile boats (not all of the classes and models of vessels currently in service in the Iranian Navy will be listed here). These include French-made missile boats, which were supplied during the Shah's rule, however they have been upgraded and equipped with Iranian Nur sea-to-sea missiles. Additionally, the Iranians are building missile boats of the *Sina* class (with a 275 displacement). They, too, are armed with sea-to-sea missiles of the Nur series
- H. I. Sutton, an analyst who specializes in Iran's naval buildup, updated on November 11, 2021, on a project to build a new model of a missile corvette 80-meters long that he assessed was being built for the Iranian navy. No further reports were provided about the status of the project or where and how many corvettes are built.[8]
- The Iranian Navy has many other auxiliary, logistics and supply ships. The highlight of the past year has been the commissioning of a large ship named *Makran*. This is a tanker, which has been converted/retooled and is intended to serve as a floating port or base. It is capable of carrying helicopters, UAV's, missile boats and a large arsenal of naval weapons. It is likely that it is also capable of transporting submarine means of transport for use by frogmen.
- Beyond these ship platforms, the advanced weapon systems manufactured by the local industry is worth noting. These include for example sea-to-sea missiles whose ranges have been increased to 180 and up to 300 km (of the improved Nur series and Gadir). It is also possible that part of the new ships are going to be armed with long-range cruise missiles, which will be launched from vertical launchers. Also noteworthy is the existence of a large number of UAVs in Iran and long-range armed UAV's which can easily be stored and launched from the various ships

8 H. I. Sutton, "New Iranian Warship Design with VLS", *Covert Shores*, November 11, 2021.

Figure 4: The Makran

Figure 5: The Makran mother ship - diagram from a paper on Iran's rapidly-developing naval power[9]

Besides Admiral Khanzadi's achievements in building the naval force, the fact that three Iranian Navy ships were damaged in various accidents during his time in office must also be mentioned. The frigate *Damavand*, which was built in a shipyard in the Caspian Sea was damaged in early 2018 apparently in stormy weather after having hit a sandbank near its home port. A logistics support ship named *Konarak* of the *Hendijan* class, which is also used for carrying and laying naval mines was damaged in May 2020 when it was hit by a Nut sea-to-sea missile that was accidentally launched

9 Raza Khan, "Rapidly emerging naval power of Iran", *The Siasat Daily*, July 15, 2021.

at it by the frigate *Jamaran* during a firing drill that was underway in the Gulf of Oman. A large (207 meters long) support ship named *Kharg*, had been ordered and built in Britain back in the days of the Shah and which had been in the service of the Iranian Navy since 1984 for special logistical missions. It had taken part in a large number of long-range voyages with the Navy's strike forces. In early June 2021, in the Gulf of Oman near the port of Jask, caught fire for reasons which remain unclear, and which ultimately led to its sinking.

Admiral Khanzari's successor as Commander of the Iranian Navy since August 2021 is Admiral Shahram Irani. This is the first time a Sunni Muslim is ascending to such a senior post in the Islamic Republic. He is a graduate of the Imam Khomeini University of Marine Sciences and has fulfilled senior roles in the Navy since 1987, including as Chief of Operations of the 1st Naval Zone (Bandar Abbas), Chief of Staff and Deputy Commander in the Bandar Abbas Region, Deputy Chief of Naval Training and Deputy Chief of Military Training. He has also commanded over important naval missions, including the sailing of Iranian warships through the Suez Canal to the Mediterranean Sea in 2011 and a number of naval rescue operations in the Persian Gulf. It can be assumed that Admiral Shahram Irani will continue the Navy's force-building momentum, as had his predecessors.

Figure 6: Admiral Shahram Irani, Commander of the Iranian Navy since August 2021

The Naval Force Building of the Iranian Revolutionary Guards (IRGCN)

The Revolutionary Guard's naval force is also been strengthened. This applies both to its naval units and to the naval elements of its proxies, which the Revolutionary Guard, led by the Quds Force, is tasked by the Islamic Republic to outfit and equip with a variety of weapons. Among them are naval means, including advanced weapons, top of the line of Iranian manufacture such as sea-to-sea missiles, armed UAVs, suicide boats, naval mines and miniature underwater means of transport. The

operations and coordination of all those proxy organizations by the Revolutionary Guard – such as Hezbollah in Lebanon, the Houthis in Yemen, Hamas and Islamic Jihad in the Gaza Strip – will be reviewed in length later on, in the section dealing with the operation of the Revolutionary Guard's naval force.

The close contact with the proxy organizations is done mainly under the leadership of the Quds Force – the name of the special forces of the Iranian Revolutionary Guard, which are responsible for all of the covert operations outside Iranian borders. It focuses on supporting and assisting Islamic (especially Shiite) terrorist organizations, Palestinian terrorist organizations and radical Islamic organizations. The Revolutionary Guard's naval force serves, in effect, as an "operations contractor" of the Quds Force in carrying out the support in the naval field to the proxy organizations such as professional guidance, supply of weapons and ammunition, and the provision of training.

Beyond that, the main mission of the Revolutionary Guard's naval force is to defend the Persian Gulf region, including the coastline and nearby islands controlled by Iran.[10] The operational characteristics and defensive or offensive methods are those of asymmetric warfare, meaning taking on external challenges and threats with superior forces through the use of fast, lethal means even against large military targets.

Between 1997 and 2018 (over two decades) Ali Fadavi served as Deputy Commander and Commander of the Revolutionary Guard's naval force. Nowadays he continues to be influential in the Revolutionary Guard since he has been appointed to serve as deputy supreme commander of the Revolutionary Guard, Hossein Salami. The command of the Revolutionary Guard's naval force was assigned to Alireza Tang-Siri in August 2018.

The naval force of the Revolutionary Guard (IRGCN), like its counterpart in the Republic's Navy, enjoys priority from the leadership of the regime and from the local military industry. Following is a rundown of several developments pertaining to the naval force building of the Iranian Revolutionary Guard in recent years:

- More than one hundred small and fast boats, of the *Taregh* and *Ashura* classes were delivered to the Revolutionary Guard's Navy in mid-2020 at the port of

[10] See later on in the "Exercising the force" section, on the possibility of extending the operations of the Revolutionary Guards Navy also to the Caspian Sea area in view of the tensions with neighboring Azerbaijan.

Bandar Abbas. These boats are armed with a machine gun and a multi barrel 107 mm rocket launcher

Figure 7: Armed speedboat in the service of the IRGCN

Figure 8: Armed speedboats model Taregh and Ashura at their handover ceremony in Bandar Abbas

- These boats are added to other speedboats named *Zolfaghar* in Iran, 17 meters in length and armed with a pair of sea-to-sea missiles of the Nasser series with a range of approximately 35 km or, alternatively, an installation of torpedo tubes. A model of this boat was built in Iran based on a North Korean model named *Peykaap*. It should be noted, that a number of boats of this model are also in service in the Iranian Navy[11]

Figure 9: Zolfaghar class missile boat in the service of the Revolutionary Guards Navy

- It became known in 2020 that the naval force of the Revolutionary Guard is developing a large ship for itself, in the order of a corvette (approximately 65

[11] A similar model of this missile boat is named *TIR*, and is also built in Iran on a North Korean basis. Iran supplied six such boats, armed with sea-to-sea missiles of the c-802 series (named NUR in Iran), to the Syrian Navy in the early 2010's.

meters long), which will be named after the shaheed Qasem Soleimani, the commander of the Quds Force who was killed in early January 2020 in an attack launched by the United States. This is a vessel with a catamaran hull which, according to the commander of the naval force Tang-Siri, will be armed with sea-to-sea missiles and anti-aircraft missiles and will have a helipad.[12] Additional information about this project reveals that the Iranian military industry is building three corvettes of this class for the Revolutionary Guard's Navy and, as of early November 2021, the first one is about to begin undergoing sea trials. The new corvette, which will have a capacity of up to eight sea-to-sea missiles, is being built on the basis of a Chinese missile boat – *TYPE-22*.[13]

- In view of the up-to-date information about the beginning of sea trials of the new model, one can suppose that this vessel will be commissioned into operations in the Iranian Revolutionary Guard's Navy service in the course of 2022. When this vessel becomes operational, this will signify a substantial improvement of the asymmetric concept of the Revolutionary Guard's Navy. We assume that this new development is the initiative of the Quds Force and that it is intended to enable a longer reach for its "asymmetry", and operations at greater ranges beyond the Persian Gulf and Iran's territorial waters in the Gulf of Oman.

Figure 10: Illustration of the new model of corvette named after Qasem Soleimani, being developed for the Revolutionary Guards Navy

Figure 11: Chinese missile boat TYPE-22, on which the new Iranian corvette Shaheed Soleimani is based

- Another interesting development, which might indicate a change in the concept of method of employment of the Revolutionary Guard's Navy, is the commissioning of a mother ship named *Shaheed Roudaki* into active service

12 Further preliminary details about this class, named after Qasem Soleimani, are included in H. I. Sutton, "Iran's New Missile Corvette Could Reshape IRGC Naval Doctrine", *USNI News*, March 29, 2021.

13 "Iranian Navy's Shahid Soleimani class frigate reportedly begins sea trials", *Navy Recognition,* November 3, 2021.

– similar to the class delivered to the Navy. . It has also been converted and adapted by the local military industry to serve as a floating port/storehouse to enable the IRGCN to increase its operational range far from Iran. It is worth mentioning that in addition to this ship, the Revolutionary Guard's Navy now has a support ship named *Sioashi* (originally a tugboat), which has been adapted to carry anti-aircraft missiles apparently in order to provide air cover for a naval strike force that would be operating on the high seas

- The building of the Revolutionary Guard's naval force, which has come to include large ships, is intended to enable this organ to operate independently as an attack naval force far from the Persian Gulf, in the Gulf of Aden, the Red Sea and perhaps even the eastern Mediterranean. Apparently, this development is inspired by the Revolutionary Guard's Quds Force, whose role is to export the Islamic revolution, including the support for its proxies in the Middle East

Figure 12: The *Roudaki* - front view

Figure 13: The *Roudaki* – top view with its various equipment and naval armaments. It carries an assortment of weapons on board (speed boats, sea-to-sea missiles, a helicopter, UAV's, a vehicle carrying anti-aircraft missiles)

Figure 14: the *Sioashi* tugboat armed with anti-aircraft missiles (the ship is flying the Quds flag)

- Due to its asymmetrical characteristics, the Revolutionary Guard's Navy uses naval weapons which are intended for special forces, commandos and frogmen, including suicide boats, naval mines including advanced, sophisticated types, small, armed UAVs, mini-submarines and various means of underwater transportation, both manned and unmanned devices.
- Part of the abovementioned weapons find their way, via the Revolutionary Guard's Navy and with the stewardship of the Quds Force, into the hands of its proxies in Lebanon, Yemen and even in the Gaza Strip. Whether through physical transfer of the equipment or by transferring parts, raw materials and technical training as to the method of manufacturing and assembling them in their destination countries

Use of the Iranian Naval Force in Recent Years

Over the past two or three years there has been a significant increase in the use of the Iranian naval force and all of its components – the Navy and the Revolutionary Guard's Navy. It is directly related to the degree of threat Iran has been perceiving in recent years since the United States' withdrawal in 2018 from the nuclear deal under the Trump administration, and in particular since mid-2019, when the one-year transitional period Trump allowed for installing severe sanctions that would prevent the export of Iranian oil had passed. In response, the Iranian rulers and the military command, including the Commander of the Navy and the commanders of the Revolutionary Guard, threatened that they would block the Straits of Hormuz, preventing passage of oil to the international markets.

Thus, in mid-2019, began a "tanker war" in the form of detention by the Iranians of tankers in the Persian Gulf and in the vicinity of the Straits of Hormuz. The tensions over the tanker traffic were exacerbated in other locations as well, outside the vicinity of the Straits of Hormuz – for example in the Straits of Gibraltar and in the

central Red Sea, this time targeting tankers in the service of Iran. As for the Iranian fear of harm to their tankers in the Red Sea, an incident from October 11, 2019, should be kept in mind, when the Iranian tanker *Sabiti*, which was sailing in the Red Sea west of the Saudi port of Jeddah, was hit twice by a weapon of some sort. At the time, the identity of the attackers was unknown, however in late November 2019 Deputy Commander of Operations in the Iranian Navy, Mohammed Mussawi, announced that Iran would retaliate for the terrorist attack against the oil tanker, which took place in October. One could deduce that the identity of the attackers had been uncovered.[14]

Over the past few years, the Iranian Navy has conducted several long-range forays into the Arabian Sea, to the Gulf of Aden and even to the Red Sea and the Suez Canal. Such voyages were in form of a "task force", consisting of 2 to 3 ships, which were assigned a numerical codename. In November 2019, Admiral Khanzadi updated that over 60 such task forces were carried out. One of their assignments was to provide protection along the Iranian shipping routes. The timing of his announcement shows that they were said against the backdrop of the attack against the tanker *Sabiti*, in early October 2019.

In early December 2019, in a launching ceremony for two new frigates, the Navy Commander, Khanzadi, made an announcement which at the time sounded rather pretentious, according to which the Iranian Navy was prepared to patrol in the Atlantic Ocean.[15] Nevertheless, in 2021 the Iranian Navy actually carried out this mission of a long-range voyage into the Atlantic Ocean. This was the highlight of its activity that year.

The task force, named "The 75th Flotilla", consisting of two ships – the mothership *Makran*, which was accompanied by the frigate *Sahand*, carried out a prolonged voyage during the spring and summer months of 2021, crossing the Indian Ocean and the Atlantic Ocean. The participation of the frigate in this long voyage is more than symbolic, since this is a ship of Iranian make, which is indicative of its technical prowess.

At the start of the voyage, it was unclear what the destination was – whether to Venezuela or to Syria (via Gibraltar). Eventually the destination was the Baltic Sea via the English Channel en route to participating in the Russian Navy Day ceremonies.

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14 Guetta, "Iran's Maritime Policy as Expressed in the 'Tankers War' of 2019".

15 Looking west: Iran is prepared to patrol the Atlantic Ocean, The Jerusalem Center for Public Affairs, December 5, 2019 [Hebrew].

It is unclear whether the arrival in Russia had been planned from the outset, but in any case, one way or the other, the vision of a task force sailing operationally and crossing the Atlantic Ocean was realized.

Figure 15: "75th Flotilla" during its long-range voyage

Figure 16: The frigate *Sahand* (Iranian-built) which accompanies the voyage in the Atlantic Ocean

It is possible that this voyage was actually intended to be a kind of show the of flag exercise. However, one must not ignore the message the Iranians sought to send, according to which the Iranian Navy has a long arm, as is typical of a "green water" fleet – meaning that it can operate independently far from its home ports.

Upon the return of "The 75th Flotilla" to its home port in Iran, in early September 2021, following a voyage which lasted over 130 days and covered a distance of approximately 145,000 km, it received warm greetings from Iranian leader Khamenei and of the Commander-in-Chief of the Islamic Republic of Iran Army General Mousavi for accomplishing the important mission in the Atlantic Ocean, which was carried out for the first time in Iranian naval history. The new Commander of the Navy,

Admiral Shahram Irani, flew out in a helicopter to greet them when they approached their home port.[16]

We assess that the day is not far that another Iranian Naval task force will arrive in the eastern Mediterranean via Gibraltar having circumnavigated Africa or via the Suez Canal. In such a case, it is likely that their presence in the eastern Mediterranean will be a long one. They will not be in a hurry to return to their home port in Iran. They will stay near the Syrian/Lebanese coast for weeks until another force will arrive to replace them. Should the Iranians realize their permanent naval presence in the eastern Mediterranean, this will have an effect on the naval balance of power in our region.

Furthermore, as has been the case in the past, the possibility of the arrival of a similar "task force", consisting of 2 to 3 ships, in the Straits of Bab el-Mandeb and the Red Sea under to pretext of securing the Iranian shipping routes in this region against attacks – should not be ruled out. In this context it should be noted that since 2016, an Iranian special operations ship (espionage/logistics) named *Saviz* had operated opposite the coast of Yemen/Eritrea. This ship belongs to, and apparently was operated by, the Iranian Navy however due to the support provided through this ship to the Houthis in their war with Saudi Arabia, it is likely that also the Revolutionary Guard's Naval Force was involved, or at least coordinated with its operation. In early April 2021 this ship was hit, according to various sources by Israel. In July 2021 an identical "sister" ship, the *Behsad*, took up its position in the region.

Beyond operating the Iranian Navy in various operational missions of patrolling, securing shipping routes, and showing presence in various hotspots in the maritime arena, another approach should be mentioned, which has been emphasized over the years of Admiral Khanzadi. While the Revolutionary Guard's Navy is perceived and characterized by international entities as a terroristic, threatening element, the Iranian Navy has in recent years attempted to harness itself in the service of diplomacy and relations with other countries. This was evident in the conducting of joint exercises with the Chinese, Russian and Pakistani navies in the Gulf of Aden and in the Indian Ocean, as well as the (apparent) harnessing of the Iranian Navy for dealing with piracy in the Arabian Sea and the Gulf of Aden.

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16 For a summary of the task force's journey, see: "Iran's 75th Formation: 1 ship of more than 1,000 tons, 1 ship of 100,000 tons, sailing for 123 days and returning to construction", *iNEWS Military*, March 20, 2022; "Iran Plans to Build Another Long-Range Mobile Forward Base, Conduct New Trans-Oceanic Missions", *sputniknews* September 14, 2021; Sam LaGrone, "Iranian Navy Flotilla Wraps up Four-Month Atlantic Deployment, Pledges More International Operations", *UNSI News*, September 10, 2021.

The voyage of the "75th Flotilla" and the presence of the Iranian Navy in the Russian Navy Day ceremony in St. Petersburg in the Baltic Sea can also be viewed in this context of Naval Diplomacy. Moreover, Khanzadi made the effort to be present at the Indian Ocean Naval symposium (IONS), which took place in June 2021 on the Island of Reunion. On the sidelines of this conference, he held a highly-publicized meeting with French Admiral Pierre Vandier.[17]

Figure 17: The meeting between an Iranian admiral and a French admiral on the sidelines of the Indian Ocean Symposium

The Operation of the Revolutionary Guard's Navy (IRGCN)

Iran's second naval arm, which is no less significant than the first, is the naval force of the "Islamic Revolutionary Guard". As for its use and operations, its main mission is usually to defend the Persian Gulf region including the coastline and nearby islands controlled by Iran.

At the time this article was written, the escalating tension between Iran and Azerbaijan has been making headlines, partly due to the Iranian claim that the Azeri territory is being used as a staging ground for Israel's operations against it. The two countries share a border in the Caspian Sea. During the very days when the tensions

17 "Iran, France navy commanders meet, confer on bilateral issues", *Islamic Republic News Agency*, June 30, 2021.

were high and maneuvers were being carried out on both sides of the border, it was reported that Iran had sent a large number of small, fast, armed boats to the Caspian Sea – apparently these are the *Taregh* and *Asura* boats which are usually operated by the IRGCN. That way, should armed hostilities break out between the two countries, this might also be played out in the Caspian Sea arena, since on the Iranian side, both Iranian Navy ships will be operating as well as boats and weapons of the Revolutionary Guard. This is a possible example of a joining of forces as has been mentioned earlier. In the event that the IRGCN takes part in hostilities against the Azeri Navy in the Caspian Sea, this will be done using asymmetric warfare tactics, which the IRGCN has specialized in over the past years in the Persian Gulf (the "swarm" tactic – storming an enemy naval force with fast armed boats).

In the past, there has been a rivalry and competition between the Iranian Navy and the IRGCN. However as already mentioned, it appears that relations between these two forces have warmed in recent years and it is evident that they are joining forces to protect and advance Iran's interests in the naval arena. Besides the fact that it is certainly the desire of the Iranian leadership that the two forces cooperate with one another, it can be assumed that this is also an outcome of the personalities and working relations of the commanders – in the Navy this was until recently Admiral Hossein Khanzadi and now his replacement, Admiral Shahram Irani. At the pinnacle of the IRGCN pyramid is Ali-Reza Tangsiri. For example, the latter arrived in mid-May 2020 at Khanzadi's office to offer his condolences for the loss of lives of the crew of the ship accidentally hit by a missile fired at it in the Gulf of Oman. On this occasion, Khanzadi said that nowadays the cooperative atmosphere between the Army and the Revolutionary Guard is strong and effective. Tang-Siri on his part reinforced Khanzadi, saying that Iran's defensive force and its deterrent force are an outcome of the unity and integrity of the armed forces under the guidance of the Supreme Leader Ayatullah Ali Khamenei.[18]

In a lengthy interview given by Tang-Siri to the Al-Alam media channel (broadcasting in Arabic) in late September 2021, he highlighted the good relations he had with both the outgoing Navy commander Khanzadi and the incoming commander Shahram Irani. He emphasized that the Islamic Republic has two navies, "which operate under the flag of a single commander, the dear commander […] who is our Imam and our leader."[19]

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18 "Khanzadi: Naval forces' willpower will foil plots", *Tehran Times*, May 17, 2020

19 Interview with Ali-Reza Tang-Siri, This is what Brigadier General Tang-Siri revealed about the underground missile cities, *Al-Alam Channel,* September 29, 2021 [Arabic].

Figure 18: The condolence visit between the two commanders

The working assumption today, as opposed to the past, is that there is cooperation between Iran's two naval branches at multiple levels – personal, technological, operational, intelligence, logistical and so forth. This cooperation between the two Iranian naval components means an increased naval threat to Israel and also toward the Sunni states in the Persian Gulf and the Red Sea. This is particularly significant in view of IRGCN's current and future force building, which enables it to operate at longer ranges beyond the Persian Gulf. As we saw earlier, using ships like the *Shahid Rudaki* and the armed tug *Sayoshi*, and certainly in case the Revolutionary Guard's plan to build a missile corvette named *Shahid Qasem Soleimani* would be fulfilled.

The IRGCN Activity and Maritime Engagement in the Various Flashpoints

During 2019–2021, the ISGCN was operating in the following flashpoints:

- The Persian Gulf and the islands under Iran's sovereignty in response to the threatening presence of the US Navy in the Strait of Hormuz and the Persian Gulf, including the entry of an aircraft carrier and a nuclear submarine into the Gulf. In several instances, IRGCN armed and fast ships came dangerously close to the US Navy's vessels.
- In Yemen, the Revolutionary Guard is heavily involved in proving aid to the Houthis during the ongoing civil war. Thus far, Saudi Arabia was the main victim of the Houthi naval threat. Every once in a while, Saudi vessels are attacked in this region by either rockets or explosive boats, or naval mines, or UAV's. The Houthis are extensively using naval mines provided by Iran. They are dropped near Saudi islands and close to the Strait of Bab el-Mandeb. The Arab coalition operating in Yemen, led by Saudi Arabia, reported a surge in terrorist activities

by the Houthis, dropping mines in the southern end of the Red Sea and in the Strait of Bab el-Mandeb. The coalition reported destroying 175 such mines that were randomly dropped by the Houthis in the Red Sea. Due to this threat, the Fifth Fleet sent two minesweepers to the Red Sea, *USS Gladiator* (MCM 11) and *USS Sentry* (MCM 3) that crossed the Strait of Bab el Mandeb on October 18, 2021.

Figure 19: The US Navy minesweeper that entered the Red Sea

- Lebanon is the IRGCN's and the Quds Force's traditional naval support area – assisting Hezbbollah, Iran's primary proxy in Lebanon and Syria. Since the First Lebanon War in the early 1980s, this Shiite organization has been the beneficiary of preferential treatment from Iran, such that Hezbollah can truly be regarded as an "Iranian column" in the Levant (Syria/Lebanon). As part of Hezbollah's military buildup, prior to the Second Lebanon War, their naval arm was also endowed with substantial momentum with the receipt of custom-made naval weapon assemblies including guided ground-to-sea missiles, one of which – a C-802 (the Iranian version named NUR) was launched and hit the Israeli missile boat *Hanit* in July 2016 during the first days of the Second Lebanon War. It is worth mentioning that Qasem Soleimani (the Quds Force commander) was present with senior Hezbollah officials at the time the missile was fired at the Israeli ship that was operating offshore Beirut[20]
- The Gaza Strip: In the past (March 2011), there was an unsuccessful attempt to smuggle Nasser sea-to-sea missiles into the Gaza Strip (the Iranian name for the C-704 missile). The working assumption is that Iran will take advantage of

[20] Raphael Ofek and Pesach Malovany, *Iran Behind the Scenes During the Second Israel-Lebanon War*, Mideast Security and Policy Studies Paper 182, BESA Center, Bar Ilan University, November 3, 2020, p. 22.

> any opportunity to improve the operational capabilities of the organizations in the Gaza Strip, and in particular the Islamic Jihad. This includes manned or unmanned underwater means of transport

Beside all of the activity in these flashpoints, it seems that the ISGCN's greatest highlight is their involvement, apparently together with other branches of the Revolutionary Guard, in attacks against shipping with links to Israel in the Persian Gulf and in the Gulf of Oman. Judging from the characteristics of the damage sustained by the ships, one can unquestionably say that these were perpetrated by the IRGCN. No official justification was given for these operations, such as the attacks being in retaliation for Israeli offensive operations against Iranian targets, including maritime targets, such as tankers and cargo ships, that were en route to Syrian ports. According to media reports, almost all the attacks were carried out using UAVs and Israel officially blamed the Revolutionary Guard's Air Force. The use of UAV's, mostly manufactured in Iran, including those launched from sea, constitutes a significant, dangerous threat both to littoral targets and to shipping.

The most recent attack (at the time this article was written) in this series of attacks was against the *Mercer Street* at the end of July 2021, which cost the lives of one British and one Romanian crewmember. This is a significant escalation – not only in Israeli eyes but also by global perceptions.

In the abovementioned interview on the Al-Alam channel, the commander of the IRGCN hinted to those attacks which are attributed to Iran and said regarding the Israeli naval threat against Iranian targets: "[…] **However, if the Zionists should threaten us one day, they will certainly feel our clout and will sense it, because for us they're nothing. The proverb says, those living in glass houses should not be throwing stones on other people's houses, since a glass house is no protection for its owner**.[21]

To summarize the characteristics of the use of naval force by the Revolutionary Guard, one must emphasize their asymmetric operations, in the form of guerilla warfare of a marine commando. Already nowadays, even without the future developments, this is a force with advanced capabilities and weaponry that are usually in the use of navies. This refers, for example, to sea-to-sea missiles, torpedoes and manned and unmanned aerial vehicles. All this is intended to carry out its defensive and offensive missions, primarily in the Persian Gulf, as well as in more remote flashpoints in the Middle East.

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21 Interview with Tang-Siri, see footnote 19.

As a "subcontractor" of the Quds Force, the IRGCN assists the proxy organizations under Iranian control, such as in Yemen, Lebanon, Syria and to an extent the Gaza Strip. In the context of the battlespace currently unfolding in the Yemeni civil war, of note are the naval mining activities, the firing of sea-to-sea missiles and cruise missiles, the use of suicide boats – all these having been supplied and trained by the IRGCN personnel.

So far, we have discussed the use of the Revolutionary Guard's Navy (IRGCN) force as we have known it in the past. However in the past two years there has been a marked trend toward force building (such as the *Shahid Rudaki* or the future corvette *Soleimani* or the armed tugboat *Sioashi*), which will enable the Revolutionary Guard to operate autonomously in remote areas such as the Arabian Gulf and in the southern Red Sea, including a presence in the Straits of Bab-el-Mandeb (not only with an espionage ship) and perhaps even a more audacious presence and arrival at the Syrian coastal region, for example to set up a base or settle in one of the northern Syrian ports – Latakia or Minet el-Beida.

The Islamic Republic's commercial shipping infrastructure

As mentioned in the introduction, the Iranian commercial shipping infrastructure consists of two main government corporations. One is the Islamic Republic of Iran Shipping Line Group (IRISL) and the other is the National Iranian Tanker Company (NITC). The two commercial companies, along with the Iranian Navy and the IRGCN, are not only economic assets for the Iranian treasury, but also constitute an addition to the Iranian maritime power since they complement and are integrated in missions from the security realm, wherever Iran has an interest.

IRISL's ships or its network of shipping collaborators have been involved in the transportation of equipment and weapons for state or terrorist organization customers over the past twenty years. Part of the shipments have been done directly on Iranian merchant marine ships while others have used merchant marine ships belonging to assisting entities.

In the past several years, the activities of the National Iranian Tanker Company (NITC) have been gaining prominence. NITC is considered to be one of the largest tanker companies in the Middle East. This company's activity has recently come into the fore due to the Iranians' attempts to circumvent the sanctions by transferring equipment and fuel cargos to Venezuela and Syria, and recently it has also enlisted – at Hezbollah leader Nasrallah's behest – to transfer fuel products to Lebanon supposedly for humanitarian reasons. At the time this article is being written, since

September 2021, several Iranian tankers have docked at the port of Baniyas in Syria. From there, the fuel products are transported to Lebanon on trucks.

Regarding this traffic of fuel transfers for Lebanon from Iran via the Suez Canal and from there to the dock in Syrian Baniyas, Iran's new navy commander recently declared that this traffic received a security escort from "Naval Task Force No. 78".[22] Insofar as those tankers were indeed given a security escort by the Iranian Navy, at most this was done as far as the Red Sea and did not include passage through the Suez Canal. It is unclear whether this line (of fuel for Syria/Lebanon) will continue to consolidate in the future. In any case it bears the potential for an additional Iranian maritime presence in the eastern Mediterranean. The possibility that in future full-scale escorts of commercial tankers by Iranian Navy ships cannot be ruled out.

Regarding the potential consolidation of the Iranian maritime presence along the Levantine shores, it is worth mentioning Hassan Nasrallah's idea that an Iranian energy company would arrive in Lebanon's waters to discover and extract natural gas within the South Lebanon Exclusive Economic Zone, inside an area still in dispute with Israel. According to Nasrallah, Israel would not dare harass Iranian energy-related activities in the region. This idea must not be overlooked, even if it is half-baked at the moment.

Summary and Conclusions

Iran under the Islamic Republic regime is gradually emerging as a regional power in the Middle East, without taking into consideration yet the existence of nuclear capability, if indeed it will exist. The Iranian leadership recognizes that as a regional power, it is compelled to project its power in the maritime arena. Thus, considerable resources are currently being invested to create this maritime power, primarily through reliance on the local industry and technological capabilities. Even if there still are remaining technological knowledge gaps in Iran, they can easily acquire this knowledge, as they can also procure spare parts and critical components from countries like China, North Korea and even Russia. In this area of weapons trade, the name of the game nowadays is **worthwhileness and financial gain**. In this context it is worth following up on the possibility that in October 2021, during the Iranian Chief of Staff's visit in Russia, a large military procurement deal was signed, which will include weapon systems, including naval systems and weapons.

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22 "Lebanon-Bound Fuel Tankers Escorted by Iranian Navy: Commander", *Tasnim News Agency*, October 11, 2021.

The Iranian naval power, which is an outcome of all the maritime components at its disposal which have been reviewed here, poses quite a few challenges to Israel, to the powers operating in the region (primarily the United States) and to other countries such as Saudi Arabia, the United Arab Emirates, Oman and Bahrain. Egypt, which has distinct interests in the southern Red Sea and Suez Canal, is also probably taking note of the naval power of Iran and its proxies because they could potentially disrupt freedom of navigation in the Straits of Bab el-Mandeb – a disruption which would directly impact Egypt's revenues from the Suez Canal.

Recently, Iran's naval strength has been posing challenges and risks also toward a neighboring country in the Caspian Sea – Azerbaijan, due to tensions which have exacerbated in the last quarter of 2021. Should this flashpoint in the Caspian Sea indeed erupt in armed conflict, Israel is bound also to be inserted in this regard, since the Iranians allege that there is an Israeli intelligence presence in the Caspian Sea, plus they allege that Azerbaijan's military capabilities (including the naval capabilities) are based on procurement and assistance from Israel.

As for Israel, despite the fact that there is no land border between it and Iran, it must bear in mind that in the maritime domain there are no borders and a hostile force might pose a threat within the maritime domain even without there being a common maritime or land frontier. It is impossible legally to prevent the arrival of a naval force in the Red Sea or in the eastern Mediterranean, so Iran's geographic remoteness should not detract from the severity of the threat it poses. Its geographic remoteness, or the remoteness of its proxies, could diminish the potential threat of missile and UAV launches aimed at Israel, since these weapons are not affected by a barrier in the form of a land border of any kind.

Beyond attacks within the State of Israel's territory, in its ports or territorial and economic waters, one has to take into consideration Iran's naval capability to harm shipping targets or shipping routes to and from Israel at various points in the Middle East, as was the case in the four attacks launched against merchant ships since spring 2021.

In any case, it is a fact that the maritime threat potential on the part of Iran has increased significantly over the past several years. Part of this increase is due to reasons unrelated to Israel, rather they are related to the perceived threat which the US administration under Trump posed against Iran, especially since 2019. This sense of unease has accelerated force building processes and has also stimulated the exercising of power, including among the proxy organizations under Iran's control.

However, not only the tensions with the United States have increased the Iranian ambitions. It seems imperative to add various opinions of analysts who believe the possibility that Israel has been operating in recent years against Iranian maritime targets has stoked the fire and aroused the "sleeping demon from its den". This article does not intend to take a stand on this issue, however it appears that the statement made by the Commander of the IRGCN, regarding that "owner of a glass house", speaks for itself and merits attention.

The maritime domain is a significant pillar of the Iranian strategic vision. It allows Iran on the one hand to threaten and operate defensively and offensively in order to consolidate its capabilities and influence as a regional power. On the other hand, the maritime domain allows it to maintain commercial ties which are vital to its economy, for oil and goods exports, in particular while the sanctions regime is still in place. In addition, this domain enables it to transact "maritime diplomacy" as part of its foreign policy.

To conclude, from everything that has been said so far, even though we do not have substantiated information regarding the existence of a maritime strategy, (officially or unofficially) the maritime component is at the center of the general strategy at the Iranian national level. Assuming this is the case, the processes of force building and exercising the Iranian naval force will continue to feature high in the priorities of this country.

Israel–Turkey Relations – An Ocean of Opportunities

Omri Eilat

Followingr Joe Biden and the Democratic Party winning the 2020 elections in the United States, 2021 has been marked by the re-evaluation of positions in the East Mediterranean basin. As part of this trend, Turkey has reassessed its relations with the countries in the region and has taken special diplomatic measures to advance its relations with Egypt, Israel, and the United Arab Emirates. The phone call between Turkish President Recep Tayyip Erdogan and his Israeli counterpart Isaac Herzog this summer aroused considerable interest but also many questions on the Israeli side.[1] On the one hand, Israel and Turkey have many shared interests and an impressive track record of cooperation, including during the Erdogan years. On the other hand, the Israeli confidence in the success of yet another move toward warming relations is very low, primarily due to Erdogan's anti-Israel stance and the formation of profound Turkish commitment toward the Palestinian issue. Although Turkey's multifaceted positions in the Mediterranean and the Middle East are not dependent on its relations with Israel, Israel's opening up to the sea in the past decade has added an extra layer to the relations between the two countries. This layer includes new dilemmas and challenges but these are accompanied by new opportunities. To understand their origins, it is critically important to understand Turkey's fundamental positions concerning the Mediterranean Sea. Only a small proportion of these are a consequence of Erdogan's reign. Most of them are much deeper-rooted, going back to the Ottoman period.

This article analyzes and presents to the readers and particularly to the decision-makers, the Turkish perspective on developments in the eastern Mediterranean basin, given the current state of affairs. This is not to say there are no profound structural problems in Turkey's relations with Israel or to argue that the criticism toward Turkey's conduct in the region is not at least partially justified. My main goal is to shed light on the many points of convergence of interests of the two countries, their complicated shared history, and this history's role as part of a regional tapestry, concerning which the Israeli comprehension is found lacking. As a rule, Israel's acquaintance with its neighbors is sparse, sometimes embarrassingly so. Moreover, the Israeli side is first to recognize a threat but the last, to sense an opportunity. I believe that, especially when Israel is reevaluating and rebuilding its web of foreign relations, these things have to be clearly stated.

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1 Rina Bassist, "Erdogan, Herzog share rare phone call," *Al-Monitor*, 13 July 2021.

The desire for a just international order

At the root of Erdogan's policy, going back to his early days as Prime Minister stands the desire to install a new world order in which Muslim countries will gain an improved positioning.[2] Turkey's leading role in promoting these efforts and claims, like speaking out against the status of the five permanent members of the UN Security Council, is, in the minds of the Turkish policy-makers, intended to provide Turkey a leadership role in the Islamic world. The Erdogan administration's deep nostalgia for the Ottoman past and its reinstatement as a Turkish "birthright", as opposed to the Kemalist approach which regarded the establishment of the republic, is the most dominant factor in the formation of Turkey's policy.[3] Moreover, suspicion and defensiveness against international arrangements and institutions have always existed in Turkey. The sense of alienation toward the international order, which is discriminatory toward Turkey, has roots going back as far as the late nineteenth century, when its western allies, Britain and France, effectively relinquished their efforts to preserve the integrity of the Ottoman Empire.[4]

At the time, the positioning of the Ottoman Empire as the protector of Muslims was a consequence of the loss of territory through wars and the displacement and massacre of Muslim communities, first and foremost by Czarist Russia, but also in the Balkans, where new nation states were asserting themselves and were gaining their independence from the Ottoman Empire with West European backing. This memory reflects substantially, directly on the Cyprus issue, which has made its way back into headlines this year. The status of the Turkish minority in Cyprus is one of a string of issues that remained festering sores in Turkish public opinion even before the foundation of the Republic. The concern of Cyprus joining forces with Greece is justified and is based on the move Crete did at the turn of the twentieth century when it won west European support despite the agreements with the Ottoman Empire, which involved the deportation of the Muslim minority from the island. The loss of the Dodecanese Islands to Italy following the latter's aggression in 1911 in Libya left the Empire and following that, the Republic was devoid of control of the

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2 Henri Barkey, "How Erdogan Muscled Turkey to the Center of the World Stage," *World Politics Review*, October 30, 2020.

3 Yağmur Karakaya, "The Conquest of Hearts: the Central Role of Ottoman Nostalgia within Contemporary Turkish Populism," *American Journal of Culture and Sociology* Vol. 8 (2020): 125–157.

4 Sean Mcmeekin, *Berlin–Baghdad Express* (Cambridge, MA: The Belknap Press of Harvard University Press, 2010), 35–52.

Mediterranean islands.[5] The vulnerability of the Turkish minority in Cyprus following its independence from Britain and the fragility of the dual-nationality agreement between the Greeks and the Turks on the island led to the Turkish invasion and underpins Turkish demands from the European Union till today.

The vulnerability of Turkish minorities outside Turkey, including the Palestinians, the loss of the Province of Mosul to the British Mandate in Iraq in the Treaty of Lausanne, which ended the Turkish war of independence in 1923, and the status of the Bosporus and Dardanelles Straits are scars, lingered in Turkish memory due to the Ottoman demise. 2019, the year in which Turkey embarked on some of its most aggressive moves, was the centenary of the humiliating Treaty of Sèvres, which dismantled the Ottoman Empire. The Turkish objections to this treaty brought upon it, among other things, the war of independence, out of which came the Turkish Republic. If the first decade of Erdogan's rule could be characterized with domestic neo-Ottomanism while treading cautiously in the international arena, the second decade has strengthened neo-Ottomanist tendencies in Turkey's foreign policy. The collapse of Syria and Iraq has made the Turkmen and Kurdish minority regions relevant once again to Turkish influence.[6] Besides the involvement of Turkish military forces as peacekeeping forces or as NATO forces in places like Iraq and Kosovo, Turkey has extended its military footprint into other areas, which do not fit this description, such as in Syria, Libya, Sudan, and Somalia - which has brought Turkish military involvement to 13 countries.[7]

From Aggressiveness to Assertiveness

The Turkish expansionist tendencies peaked in 2019 with the implementation of the "Blue Homeland" doctrine by the Turkish Navy. This doctrine was first introduced in 2006 by Admiral Cem Gürdeniz in a symposium held at Navy headquarters as an academic-strategic exercise. It became Turkey's official program. According to Blue Homeland, Turkey has rights to a vast offshore expanse – 462 thousand sq. km – in the Mediterranean, the Aegean, and Black Seas. This area includes territories which according to international conventions are recognized as belonging to Greece and Cyprus. Turning the doctrine into official doctrine came with extensive naval

5 Mustafa Aksakal, *The Ottoman Road to War in 1914: The Ottoman Empire and the First World War* (New York: Cambridge University Press, 2008), 4–7.

6 Nick Danforth, "Turkey's New Maps Are Reclaiming the Ottoman Empire," *Foreign Policy*, October 23, 2016.

7 Selcan Hacaoğlu, "Mapping the Turkish Military's Expanding Footprint," *The Washington Post*, August 31, 2020.

exercises, seismic research work in the Exclusive Economic Zones of neighboring countries, and expulsion of ships, including Israel's *Bat Galim*, from Economic Waters claimed by Turkey as part of the doctrine.[8]

Although The Blue Homeland doctrine encountered substantial difficulties given the French intervention in the summer of 2020 and the change of government in the United States in January 2021, Turkey's claims in the eastern Mediterranean basin continue to challenge the international system. The Turkish aggressiveness has been substantially tempered but the claims and aspirations for dominance in the Middle East have remained valid, have not diminished and are not expected to be taken off the table. The stationing of squadrons of UAVs at the Geçitkale airport in northern Cyprus and Erdogan's demanding statements directed at the European Union regarding the status of the unrecognized Turkish republic on the island on the 47th anniversary of the Turkish invasion are indicative of the Turkish belligerent position.[9] This position is being rewritten into various doctrines, which have been replaced several times during the second half of Erdogan's time in power. It represents the attitude of a party that feels excluded from the international system, or which in the least, is underrepresented. According to the Convention on the Law of the Sea, the inherent discrimination against Turkey in the Economic Waters of the East Mediterranean basin renders it unacceptable for Turkey, which prefers to reach a political resolution of the issue.

In the regional rivalry, aerial force building is intricately intertwined in the developments within the maritime space. The development of Turkey's aircraft carrier, the *Anadolu*, was originally intended to carry F-35 aircraft, which are capable of vertical take-off and landing. The removal of Turkey from the aircraft's development project and the cancellation of the sale by the US Congress during the Trump presidency was a consequence of the crisis over the S400 air defense system, which drove a massive Russian wedge into NATO. Despite Turkey's desire to resolve this crisis and repair its relations with the US administration, this dramatic snafu cannot be solved without severe strategic harm to NATO or through massive indemnification by the US administration in return for disabling the system. The meaning of the second course of action will be an entry into conflict with Russia,

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8 Omri Eilat and Ayal Hayut-Mann, "The Turkish Maritime Doctrine - The 'Blue Homeland' (Mavi Vatan)," in Shaul Chorev and Ehud Gonen (eds.), *Maritime Strategic Evaluation for Israel 2020/21* (Haifa: Haifa Research Center for Maritime Policy & Strategy, University of Haifa, 2021), pp. 187–195.

9 Günter Seufert, "Erdoğan the Builder in Northern Cyprus," *Stiftung Wissenschaft und Politik Comments*, 47.

which might be detrimental to the construction of the nuclear plant Turkey has set its sights on. The way Turkish diplomacy functions in this area is a complicating factor in itself. Erdogan's statements regarding the purchase of an additional S-400 battery as a warning to the American side are severely harmful to the renewed attempts at rapprochement between Turkey and the United States.[10]

Besides this, Turkey's independence in terms of aircraft has seen a dramatic development in recent years, with the Bayraktar TB2 UAV becoming operational, and the success of its sale to the Ukrainian and Polish armies has turned a corner in Turkey's strategic status. Turkey's alienation from the United States and Israel in the past decade has been accompanied by the development of a more independent aircraft industry, where the development of the Bayraktar is its most outstanding achievement. This development actually offers potential for reducing Turkish aggressiveness due to its growing self-assurance of its regional status. It goes hand-in-hand with the general shift toward moderation to the extent of assertiveness and retention of its long-term demands.[11]

Turkey and Israel: From Crises to Opportunities

As part of Turkey's attempts to improve relations with the United States, it has been trying this past year to improve its relations with its leading allies in the region: Israel, the United Arab Emirates, Egypt, and Saudi Arabia. The Turkish-Israeli relations had begun deteriorating since Operation Cast Lead in late 2008, wherein response, Erdogan began publicly criticizing Israel. At a meeting of the World Economic Forum in Davos in the winter of 2009, Erdogan left the stage in anger when during a session that discussed the fighting in Gaza, the then-President Shimon Peres defended Israel's position. The flotilla which set off from Turkey in May 2010 toward the Gaza Strip and the incident onboard the Mavi Marmara in the summer of 2010 brought relations between the two countries to an all-time low, which downgraded diplomatic ties to their lowest level. Despite an attempt to resume the relations in 2016, assisted by President Barak Obama through a series of measures which included the restoration of ambassadors, the ethical differences between the countries trumped their shared interests with the advent of the Marches of Return in the Gaza Strip in summer 2018, which received Turkish backing, and which touched off violent confrontations along the border fence. Turkey began openly supporting Hamas and directly confronted

10 Henri Barkey, "Resolving the S-400 Crisis Could Revive the Turkish-American Alliance," *The National Interest*, May 25, 2021.

11 Burak Bekdil, "The Rise and Rise of Turkish Drone Technology," *BESA Center Perspectives Paper*, No. 1,992, April 11, 2021.

Israel on matters unrelated to the Palestinians. In a memorable incident in November 2019, Turkish Navy ships expelled the Israeli research vessel the *Bat Galim*, which belongs to the Israel Oceanographic and Limnological Research (IOLR) Institute, from the Cyprus Exclusive Economic Zone. This incident was yet another example of the deterioration of the relationship between Israel and Turkey, albeit the causes were a dispute between Turkey, Greece, and Cyprus over control of the offshore gas deposits in the Mediterranean.[12]

In spite of all these, the countries' economic interests remained out of sight. Despite the diplomatic rift, trade between the countries kept on growing and crossed the $6 billion per year mark. Of course, the potential for trade growth was much larger, and Israeli exports to Turkey are highly undiversified (based primarily on oil products from the Israel Oil Refineries).[13] Besides the tensions, there was the question of gas exports from the Leviathan Deposit and the plans for a gas pipeline that was supposed to transport gas from this deposit to Cyprus, Greece, Bulgaria, and Italy. Furthermore, the Israeli decision-makers are continuing with the plan to export gas to Europe, ignoring the fact that the profound maritime dispute between Turkey and its neighbors, Greece and Cyprus, will preclude the passage of the pipeline, which is already very expensive and complicated, via the planned route. Even if the Israeli, Greek, and Cypriot positions are legally iron-clad in accordance with the Convention on the Law of the Sea, the multinational energy companies are not going to take the risk that their huge investments will be destroyed due to a maritime dispute which has already produced Turkish-Israeli and Turkish-Greek conflicts in international waters.[14]

Although Turkey is experiencing difficulties nailing down a consistent foreign policy, it does not restrain itself from making aggressive statements and moves against its neighbors. It is a key country for the establishment of effective regional cooperation, not only because of its strength but also due to the many points at which its interests dovetail with Israel's interests. The gas discoveries in the eastern Mediterranean and the Black Sea, the increased need to safeguard environmental security, and Iran's footprint in Syria and Lebanon serve as leverage for expanding the collaboration.

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12 Gallia Lindenstrauss and Remi Daniel, "The Ships that Scuttled Turkey-Israel Relations: A Decade since the Flotilla Incident", *INSS Insight* no. 1323, INSS (May 25, 2020), 1

13 "Turkey's Exports to Israel," in *Trading Economics*; "Israel's Exports to Turkey," in *Trading Economics*.

14 "Report: Turkish Navy Intervenes in EastMed Pipeline Survey," in *The Maritime Executive,* September 29, 2021; "Turkish ships said to force Israeli research vessel out of Cypriot waters," in *The Times of Israel*, December 14, 2019.

Such a move can take place in two ways: using the convergence of the economic and geopolitical interests to bypass the existing problems, assuming that these remain unresolvable for the time being; or using the convergence of interests to settle the deep-seated problems in such a way that will facilitate the creation of a long-term, sustainable partnership.

The issues of energy and the Economic Waters figure high on the Turkish agenda. The economic crisis Turkey is currently enduring in an age of vulnerable global trade makes the issue of long-term stabilization of prices and supply chains ever-more critical for it. Turkey's demands to substantially extend its Exclusive Economic Zone and the desire for more energy independence are not dependent on Erdogan's desires. They enjoy wall-to-wall support among the Turkish public. Moreover, the gas discoveries in the Black Sea basin and the desire to reach extraction agreements with energy companies Chevron and Exxon-Mobil brings Turkey even closer to Israel following Chevron's acquisition of Noble Energy's holdings in the Leviathan and Tamar fields. If in the past the tensions between Israel and Turkey due to the Israel-Palestinian relations overshadowed the maritime tensions, the needs and opportunities in the maritime-energy fields are now the root cause of Turkey's overtures toward Israel despite the situation between Israel and the Palestinians.[15]

The Turkish overtures toward Israel are a signal that they are serious, and they merit attention on the Israeli side. Of course, the Turks must realize that it will not be possible to bypass Israeli Prime Minister Naftali Bennett's office, and no Israeli official should create the impression that this is possible. Moreover, Israel has got to make it clear that any progress made in the relations with Turkey cannot come at the expense of its ties with Greece, Egypt, and the United Arab Emirates. Israel made a mistake in the 1960s when it adopted an excessively pro-Turkish position. David Ben Gurion's efforts to forge the "Periphery Alliance" (with Turkey, Iran, and Ethiopia) were manifested in unequivocal public support for the Turkish side to the extent that it motivated several countries to support Turkey's interests in Cyprus' affairs. These efforts led to several years of good, albeit hesitant relations on the Turkish side until the Six-Day War and to a long-standing rift with Greece and Cyprus, which lingered until the Oslo accords. Therefore, for Israel, it is advisable to support a political settlement (and not in accordance with the rules of the Convention on the Law of the Sea), concerning Turkey's dispute with Greece over the delineation of the Exclusive Economic Zone between them. However, we must not be tempted by Turkish initiatives directed at Israel to agree between them in this area at the expense

15 Murat Temizer, "East Med energy could be key to improving Turkey-Israel relations," in *Anadolu Agency*, July 13, 2021.

of Greek Cyprus, without a comprehensive settlement of the island's partitioning, a settlement which for the time being is not in the offing.

Turkey's cooperation with Israel can be built around the activities of the energy companies in the region. The distinct Turkish interest in enlarging the local energy market presents an opportunity for improving relations. One possible solution might be the liquefaction of the gas and exporting it. The cost of liquefaction is indeed very high but it will bypass the question of maritime boundaries. Besides that, the need on the part of the European and Turkish markets to diversify their energy sources due to Russia's aggressive actions might incentivize future support for various solutions which will enable exports of gas from the Israeli, Lebanese and Cypriot deposits to Europe. Another important channel for advancing the relations can be around the development by Chevron of the new gas deposits in the Black Sea. This way, Chevron would benefit by increasing its activities in the region. This way, the US administration could advance an effective economic partnership, which will increase stability in the region such that it would demand less direct US involvement and would counterbalance the Chinese activity in the region without detrimental impacts on diplomatic and security assets. Due to these added values, the US administration might be attentive to the development efforts despite its intention to limit the development of fossil fuel deposits around the world.

Besides, the increase in maritime activity in the region creates significant shared interests between the relevant countries in the security and environmental areas. Against the backdrop of these interests, there is potential for broader collaboration, which requires stability and a lengthy maturation process in regional settlement of the maritime boundaries in the eastern Mediterranean basin. This is an extremely difficult process but the Israeli decision-makers need to realize that despite the strategic alliance with Greece and the deep understanding with Egypt, Israel will not be able to export gas to Europe without close coordination with Turkey, which forms one of the important energy corridors to Europe. Ironically, Israel and Turkey, two countries that have not signed up to the Convention on the Law of the Sea and which are known for their preference of agreed political solutions rather than involvement of international factors, could be the ones to advance it. Turkey is on the path toward renewed warming of ties with Egypt, Saudi Arabia, and the UAE in what seems to be a possible beginning of stabilization in the region. Moreover, the entrenchment of Iran on the Mediterranean shores as part of Lebanon's implosion is a wake-up call to all countries in the region, and first and foremost to Israel, and this is supposed to motivate them to cooperate.

With all of these opportunities and challenges, Israel needs to internalize the change that has occurred in its strategic position in the Middle East following the change of administrations in the United States. The commonality between Israel and Turkey is that they both were given the green light to pursue a regional policy free of outside pressures with the blessing of President Trump. Nowadays, Turkey will no longer be able to conduct itself in the Mediterranean the way it had in the two final years of the Trump presidency, and Israel will not be able to rebuild its political-strategic relations with the Democratic administration in the United States without any movement on the Palestinian issue. This reality ought to increase the cooperation between the two countries. They both have much to gain from this.

Changes and Transformations in the Red Sea Basin – and the Implications for Israel

Moshe Terdiman

Introduction

2021 has been a year of changes and transformations in the Red Sea Basin due to several developments which took place almost simultaneously. In November 2020, the Horn of Africa instantaneously transformed from an area which had enjoyed two and a half years of peace, prosperity and development into a region rife with conflicts following the outbreak of the civil war in Ethiopia, the border war between Sudan and Ethiopia and the rising tensions in the region between Egypt, Sudan and Ethiopia following the completion of the second filling of the Renaissance Dam in July 2021. In parallel, in early January 2021, a trans-Gulf reconciliation agreement was signed between Qatar and Saudi Arabia, the United Arab Emirates, Bahrain and Egypt, which brought to an end the disconnect and power struggles between these countries, which had been ongoing for three and a half years.

At the same time, 2021 has also seen the growing importance of the Red Sea to Israel. The Red Sea has become part of the arena in which Israel and Iran are playing out their conflict – an arena spanning the entire Middle East and beyond. As a result, and due to the civil war in Yemen, the threats to Israeli shipping have only intensified. The blocking of the Suez Canal in March 2021 was another incident that highlighted the fact that the threats to shipping in the Red Sea are not limited to the military-security aspect, but to economic aspects as well. Iran's activities in the Horn of Africa against its rivals has also raised the risk bar to Israel in the region.

These and other developments that have taken place in the region, which I will mention later on, and the radical reshuffling of the situation in the region impact Israel as well and the way it should adjust to the rapidly-changing conditions. In this article, I will review the developments and changes that have taken place this past year in the Red Sea basin and their implications for Israel.

Threats to Shipping in the Red Sea

2021 was characterized by a relative relaxation of threats to the freedom of navigation in the Red Sea. Although the civil war in Yemen continues to threaten the

freedom of navigation in the Red Sea and the western Indian Ocean[1] and in this past year the Houthis even attacked strategic targets in Saudi Arabia from the sea, such as the Port of Jeddah and the Port of Yanbu, the levels of threat to the freedom of navigation in the Red Sea and Gulf of Aden on the part of Somali pirates has been reduced significantly. Therefore, as of September 1, the world's leading shipping organizations – BIMCO, ICS, INTERCARGO, INTERTANKO and OCIMF – agreed to scale down the boundaries of the region designated as being at an increased risk by the Somali pirates in the Indian Ocean – to the southern and eastern portions of the Yemeni and Somalian territorial waters and economic waters.

Another threat to international shipping in general and Israeli shipping in particular has arisen from the covert war between Israel and Iran, which has been playing out in the past two years in the maritime arena and which has made headlines only after the attack on the Iranian spy ship *Saviz* in the Red Sea opposite the Eritrean coast on April 6, 2021. In this battle, Israel attacked commercial ships, which were transporting Iranian oil and weapons to Lebanon and Syria, in the Red Sea and Eastern Mediterranean using naval mines and torpedo missiles. Israel however avoided sinking the vessels. This was done in an effort to thwart Iran's attempts to circumvent the American sanctions on its oil industry and to foil the transfer of armaments from Iran to Hezbollah. In response, and also as revenge for the killing of the commander of the Quds Force, Qasem Soleimani, and the head of the Iranian nuclear program Mohsen Fakhrizade, the Iranians attacked several Israeli-owned commercial vessels, including vessels which are not Israeli-owned but which are carrying cargoes intended for Israel, in the Red Sea, the western Indian Ocean and the Persian Gulf. Thus, for example, the Iranians attacked the Israeli-owned ship *Helios Ray* in the Gulf of Oman on February 25, the container ship *Lori*, which is owned by Israeli businessman Udi Angel also in the Gulf of Oman on March 25, and the Israeli-owned *Hyperion* near the Emirate of al Fujairah on April 13. These attacks were carried out mainly through the use of naval mines and torpedo missiles. However, on July 30th this battle escalated when the Iranians attacked the Israeli-owned *Mercer Street* near Oman using UAVs, which hit the ship and for the first time, cost lives – of two crew members – one British and one Romanian.

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1 For more information on the threat posed by the Houthis to the freedom of navigation in the Red Sea, see Benni Ben Ari and Moshe Terdiman, “Geography and Strategy in the Red Sea – The Current Situation", in Shaul Chorev and Ehud Gonen (eds.), *Maritime Strategic Assessment for Israel 2020/21* (Haifa: Maritime Policy and Strategy Research Center, University of Haifa, 2021) pp. 99–124.

In this context, one should note that there is also a potential future strategic threat, which was expressed in the blocking of the Suez Canal to shipping for six days by the *Ever Given*, which is one of the world's largest container ships at 400 meters in length and carrying some 18,300 containers. It got wedged diagonally across the Suez Canal on March 23 and blocked the waterway completely. This blockage emphasized the vital role the Red Sea plays as a main shipping lane through which approximately 12% of all global trade passes on a daily basis. This also emphasized the severe economic harm this causes. Therefore, already during the incident itself and for fear that it would be days or weeks until the container ship would be freed, container ships and oil and natural gas tankers abruptly decided to change course and sail around the African continent via the Cape of Good Hope, as they had done before the Suez Canal was opened. Data from the Lloyds Insurance Company showed that the stricken ship delayed approximately 9.6 billion dollars of trade each and every day, which is equivalent to 3.3 million tons of cargo per hour or 6.7 million dollars per minute, This only emphasized the severe economic harm caused by the canal blockage.[2] The canal blockage also disrupted the supply chains, which lasted for several months and brought down oil prices.

The canal blocking and the heavy economic damage wrought as a result exposed the various alternatives to the Suez Canal and the Red Sea. Iran is advancing an overland transport corridor from the Pakistani ports or directly from China via Syria or Turkey, which will pass through its territory. Russia is advancing the northeastern route from China to Europe via the Arctic Ocean. China is advancing an overland and overseas silk road from its territory to Europe. Israel, too, is advancing a plan to connect the Persian Gulf countries to the Mediterranean via a network of railways which will fan out from Haifa to the Gulf States and pass via Jordan, and the train line between Ashdod and the Port of Eilat. Both these projects require tremendous investments and have not yet been carried out. The fear of a future recurrence of such an incident in the Suez Canal might lead to investments in implementation of alternative plans to the Suez Canal.

Regional conflicts in the Horn of Africa

At the same time, the past year also saw a destabilization of the Horn of Africa, which virtually overnight was transformed from a peaceful, developing, prosperous region into a land rife with conflict, particularly as a result of the civil war in Ethiopia and its regional consequences. The Ethiopian civil war broke out on November 4, 2020

2 Mary-Ann Russon, The Cost of the Suez Canal Blockage, *BBC*, March 29, 2021.

following a rise in tensions between Abiy Ahmed, the Ethiopian Prime Minister, and the Tigray People's Liberation Front, which had ruled Ethiopia between 1991 and 2018, his non-recognition of the regional elections which were held in the Tigray National Regional State in September 2020 and his intention to enforce the Ethiopian government's centralized rule on Tigray as well. Initially, this war was limited to the Tigray region alone, but beginning in July 2021, it morphed into a total civil war involving all of the Ethiopian regions. This civil war is also a regional conflict in which the Ethiopian government is supported by its neighbors, Eritrea, Somalia and Djibouti. Sudan, on the other hand, took advantage of the civil war to take over the region of Fashaga in November 2020, control over which has been in dispute between it and Ethiopia. As a result, sporadic border skirmishes have been ongoing in 2021 between the Sudanese army and militias from Amhara State in Ethiopia, which claims sovereignty over this region.

The civil war in Ethiopia highlighted the extent to which Ethiopia is dependent on Djibouti and how desperately Ethiopia needs alternatives to the Port in Djibouti. Following the fighting which broke out between the Somalis and the Afars in the east of the country and following the protests against the inaction on the part of the Ethiopian government and the government of the Somali province, the Somalis blocked the railway line and main road linking Djibouti and Addis Ababa, a vital link through which some 80% of all Ethiopian exports and imports pass.

Besides these conflicts, the negotiations between Egypt, Sudan and Ethiopia regarding the Renaissance Dam is still in a stalemate and 2021 even saw a sharp rise in the tensions between the countries following the declaration of the Ethiopian Minister of Water, Irrigation and Energy, Seleshi Bekele, on July 19, that the second filling of the Renaissance Dam had been completed and following his announcement on September 10 that electricity generation from the dam would begin one month later. While calling on Ethiopia to return to the negotiating table and settle the dispute over the dam through diplomatic means, Egypt created a network of alliances with Nile Basin, Horn of Africa and East African states, in an effort to consolidate its influence in these regions and to exert diplomatic pressure on Ethiopia to come back to the negotiating table. As part of this effort, Egypt's President held a first official visit since 1977 to Djibouti on May 27, where he met his counterpart, Omar Gouelleh, and during which the two Presidents agreed to set up an Egyptian logistic zone in Djibouti and to increase Egyptian investments in the country. In addition, Egypt attempted to enlist mutual allies of its own and of Ethiopia to mediate on the Renaissance Dam and to apply pressure on the Ethiopian government to sign an agreement. As part of these efforts, Egypt tried to draw Israel into the fray despite its refusal to mediate between Ethiopia and Egypt on this matter. In the first public

visit of an Israeli Prime Minister in Egypt in 11 years, a-Sisi and Israeli Prime Minister Naftali Bennett met in Sharm el Sheikh on September 13 and a-Sisi said that "there is a common understanding between ourselves and Israel regarding the Renaissance Dam. We agreed that this issue should be resolved as part of a lively negotiation and dialog. This is an issue we consider to be a matter of life and death".[3]

Moreover, tensions between Somalia and Kenya have also escalated to a boiling point in 2021 due to a claim Somalia lodged in 2014 with the International Tribunal in The Hague regarding an area of 30,000 square nautical miles in the Indian Ocean where there is potential for large oil and gas deposits, and which is a source of livelihood for the Kenyan fishermen. This is due to the issuing of a ruling at the International Court on October 12, which redrew the maritime border between the two countries assigning most of the territory Kenya claimed as its own to Somalia. Kenya rejected this ruling even before it was issued as well as afterwards.

The Gulf Reconciliation Agreement

In contrast, a reverse process unfolded in the Arabian Peninsula and northern Red Sea in 2021 – a process of reconciliation and forging of cooperation. The process began on January 5 when the leaders of the Gulf States met for a summit in Al-'Ula in Saudi Arabia and signed a reconciliation agreement to end the crisis and disconnection between Qatar and Saudi Arabia, the United Arab Emirates, Bahrain and Egypt, which had lasted three and a half years from June 5, 2017. Turkey, Qatar's ally, also maintained contacts with Egypt, the United Arab Emirates and Saudi Arabia.

At the same time, during the past year there has been rapid progress in the political, security and economic relations between Greece and Cyprus and the United Arab Emirates, Saudi Arabia, Israel, Egypt, France, and India following the discovery of the natural gas deposits in the eastern Mediterranean and their desire to check Turkey's assertive policies in the Mediterranean Sea and the Red Sea. It is possible that this progress is a harbinger of the creation of a new space ranging from India through the Persian Gulf and the northern Red Sea to the Eastern Mediterranean and France.

Behavior patterns of the regional powers in the Red Sea Basin

2021 also saw some substantial changes in the way the regional powers operated in the Horn of Africa. First, following the Gulf reconciliation agreement and the

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3 Asaf Gabor, A-Sisi Met with Bennett to Enlist Israel in the Water War, *Makor Rishon,* 14 September 2021 [Hebrew]; Jacky Hugi, Consoling itself from afar with the troubles of others? The reason why Israel does not intervene in regional disputes, *Maariv,* 16 July, 2021 [Hebrew].

warming of relations between Qatar and Turkey on the one hand, and Saudi Arabia, the United Arab Emirates and Egypt on the other, the regional powers are once again working in concert in the Horn of Africa countries, the way it was pre-Gulf crisis, during which each country was operating to advance its own interests. For example, Turkey and Qatar have resumed working in Sudan alongside Saudi Arabia, the United Arab Emirates and Egypt. Qatar began operating in Somaliland alongside the United Arab Emirates and Saudi Arabia renewed its relations with Somalia, a Qatari and Turkish stronghold.

Second, the regional powers have toned down their involvement in regional conflicts. One reason for this was their attempt to avoid criticism and punitive measures from the Biden administration, to improve their image in his eyes and to show him that they are also capable of playing a constructive role in advancing the American interests in the region. Thus, for example, Saudi Arabia suggested a new peace plan in March 2021 to end the war in Yemen, which has yet to come to pass and the United Arab Emirates withdrew its forces from the Assab Base in Eritrea, after the Biden administration in January suspended a weapons deal that had been signed between the UAE and the Trump administration due to its involvement in the war in Yemen. The second reason was their unwillingness to harm their bilateral relationship with Egypt, Sudan and Ethiopia. As a result, Saudi Arabia and the United Arab Emirates did not mediate in the Renaissance Dam dispute and they are avoiding any involvement in the civil war in Ethiopia. Turkey, too, is avoiding getting involved in the Ethiopian civil war since it is concerned that this might be perceived as support for the Ethiopian government regarding the Renaissance Dam, and might therefore put an end to contacts underway between Turkey and Egypt.

Third, even though the two security-economic frameworks that were set up in the Red Sea basin in 2020 continued to exist this past year as well, they have remained inactive. These are: the Council of Arab and African Countries Bordering the Red Sea and Gulf of Aden, headed by Saudi Arabia, and the Intergovernmental Development Authority, which includes eight countries from east Africa and the Horn of Africa.

The Saudi Arabian behavior pattern in the region has also changed in 2021. Saudi Arabia has done everything possible to retain its leading position among the Gulf states in the context of the Red Sea security, particularly due to the fact that it had played a minimal role in preventing the struggle over the dam, which might destabilize the entire region. Therefore, on July 6 it announced its support for Egypt's and Sudan's water rights and for a solution to the Renaissance Dam issue which would involve the Arab League and the African Union. This announcement, along with the repatriation of 40,000 Ethiopian foreign workers a month earlier exacerbated

tensions between Saudi Arabia and Ethiopia. Saudi Arabia also consolidated its presence and influence in Sudan through investments in the country in various sectors which, according to the Chairman of the Saudi-Sudanese Business Council Hussein Saeed Bahri, totaled $4 billion,[4] and through development of the Sudanese Red Sea Province, which is located along the Red Sea shores, including construction of a new port or development of the existing port at Port Sudan. Interestingly, the United Arab Emirates also expressed interest in investing in the development of Port Sudan, however, the Sudanese government rejected this suggestion.

The United Arab Emirates, in contrast to Saudi Arabia, followed a strategy of enlarging its military bases in southern Yemen and strengthening its ties with Somaliland. In May 2021 it completed the construction of a new air force base on the island of Mayyun in the Straits of Bab el-Mandeb, an island belonging to the Yemeni government with a 1.85 km long airstrip suited for attack, spy and carrier aircraft, and transferred weapons, equipment and soldiers to the base. This base allows the United Arab Emirates to monitor all of the shipping passing through the Straits of Bab el-Mandeb and consolidate its sphere of influence around the Straits of Bab el-Mandeb through its presence in Socotra, Aden and Mayyun Island. At the same time, it has consolidated its presence in Somaliland. On March 17, Abdullah Muhammad Al Naqbi presented his credentials as Director of the UAE Trade office in Somaliland and he vowed to strengthen the ties between the two countries. The Emirati company DP World invested $442 million in enlarging the Port of Berbera in order to transform it into a first-class world port and center. As part of that, in June, it inaugurated the tanker terminal in the Port of Berbera and the new Berbera economic zone. In May, the company signed an MOU with the Ethiopian Ministry of Transport according to which it will invest $1 billion over ten years to build a logistic and commercial corridor connecting the Port of Berbera with Ethiopia.

Turkey, for its part, has continued to cement its naval presence and commercial ties with the countries in the region. It has extended the Turkish Navy's mission to the Gulf of Aden, to the Arabian Sea and to Somalia's territorial waters by an extra year beginning in February 10, 2021. At the same time, in order to tighten and increase its maritime trading ties and volume with the Horn of Africa countries, the Djibouti shipping company opened a new trading route in October 2020, operating exclusively between Turkey and Djibouti and Somalia, shortening the sailing time from the former 35 to 50 days down to only nine or ten days. Container ships will be operating along this route with a capacity of 11,000 and 20,000 tons.

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4 Saudi Arabia talking to Khartoum about boosting infrastructure and more, *Global Times*, September 13, 2021.

The superpower rivalry over consolidating influence and presence in the Red Sea

2021 saw the shift of the balance of power throughout the Red Sea basin to local leaders who have played an important role in the power struggles between the superpowers, maneuvering them in order to achieve their aims. Therefore, countries on both sides of the Red Sea have strengthened their ties with Russia in order to apply pressure on the Biden administration to change its policy toward them or in order to counterbalance him. On the other hand, Russia has taken advantage of the situation in order to cement its status and influence in the Red Sea basin. For example, Abiy Ahmed strengthened his ties with Russia due to the European Union and United States applying pressure on his government and that of Eritrea to put an end to the fighting, to negotiate an end to the conflict and to enable the passage of humanitarian aid to the province of Tigray. In order to do so, they suspended aid budgets, suspended the military cooperation between France and Ethiopia, which should have established an Ethiopian navy, and imposed sanctions. In June, the Russian Foreign Minister Sergey Lavrov, met with his Ethiopian counterpart Demeka Mekonnen, who announced Ethiopia's readiness to host the Africa-Russia forum in Addis Ababa in 2022. In July, Ethiopia and Russia signed a military cooperation agreement focusing on the transfer of knowledge and technology. Russia even deployed observers for the Ethiopian general elections, while the European Union withdrew its observers. Russia provided strategic weapons to protect the Renaissance Dam and to help the Ethiopian army in its war in Tigray. Saudi Arabia, which normally relies on the West for military support, and Egypt, also signed bilateral military cooperation agreements with Russia in August 2021.

However, Russia's buildup of its presence in Sudan has been halted for the time being. In November 2020 Russia announced it had reached a 25-year agreement with Sudan to lease land for the construction of a logistics facility in Port Sudan to host up to four Russian Navy ships and 300 soldiers in exchange for weapons and military equipment it would have been sending to Sudan. Yet, Sudan asked to renegotiate the agreement before its ratification in parliament. According to the terms of the new agreement, it would enable Russia to build a naval base which will function only for five years with an extension option on the lease for a period of up to 25 years only on condition that Russia would provide it with economic assistance. Russia has not yet responded to this officially. There are reports that the United States was involved in this through offering Sudan an aid package worth millions of dollars in exchange for cancelling the agreement it had signed with Russia.[5]

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5 Nikola Mikovoc, Sudan Tries to Strongarm Russia. It May Backfire, *The Arab Weekly*, September 16, 2021.

In addition to these events, Pakistan and India penetrated the Red Sea Basin in 2021. In February, a Pakistani Navy boat visited Djibouti and Sudan as part of a deployment in Africa. Another Pakistani Navy boat visited Djibouti in June. Additionally, representatives from the land, sea and air forces of Pakistan participated for the first time since 2009 in the multinational exercise codenamed Shining Star, which took place in the Mohamed Najib Army Base in Egypt. India too has recently begun penetrating the Red Sea Basin. In April 2021, India and Eritrea agreed to increase the cooperation between them in civilian areas. On September 10, a frigate from the Indian Navy took part in a joint training exercise together with two Sudanese warships near Port Sudan. In September, Indian and Egyptian Navy forces held joint maneuvers in the Mediterranean.

Renewed Iranian activity in the Horn of Africa

And finally, it appears that Iran, too, has returned to the Horn of Africa and has opened there a new front in its battle against its adversaries. In February, the Ethiopian Intelligence Agency uncovered an active terrorist cell consisting of 15 personnel along with a large cache of explosives, and claimed that it had foiled a potentially large-scale terrorist attack in Addis Ababa against the United Arab Emirates embassy. The Ethiopian National Security and Intelligence Service claimed that another group of terrorists had planned to attack the United Arab Emirates embassy in Sudan. American and Israeli sources claimed that this operation had been orchestrated by Iran, whose intelligence services had in the autumn of 2020 activated a sleeper cell in Addis Ababa in order to collect intelligence about the embassies of the United States, Israel and the United Arab Emirates in the city, as part of an effort to locate targets for attacks in African countries, through which Iran would be able to avenge the deaths of Mohsen Fakhrizade, the Iranian nuclear scientist, and of Qasem Soleimani, commander of the Quds Force. A spokeswoman of the Iranian Embassy in Addis Ababa denied the allegations.[6] Apparently, Iran had also been involved in the civil war in Ethiopia. According to unsubstantiated reports from August, Iran had signed an agreement to send several UAVs model Mohajer 6, which had been observed in the Samara Airport in Afar Province.[7]

Conclusion – Implications for Israel

Israel's strategic goals in the Red Sea are directly and closely related to economic and security goals, primarily preventing the blocking of the Straits of Bab el-Mandeb,

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6 Ethiopia Foils Iranian Plot to Target UAE Embassy in Addis Ababa – Report, *The Times of Israel*, February 15, 2021.

7 Wim Zwijnenburg, Is Ethiopia Flying Iranian-Made Armed Drones?, *Bellingcat*, August 17, 2021.

preventing the transfer of Iranian oil and weapons to the Houthis in Yemen, to Hezbollah and to Syria. The maritime fight against Iran in the Red Sea, in the western Indian Ocean, in the Persian Gulf and in the Mediterranean presents a threat to these Israeli interests.

The changes and transformations in the Red Sea in the past year show just how dynamic and highly explosive this region is, on the one hand, and how much the area is in the midst of a period of uncertainty, on the other hand. As a consequence, most of the regional powers are reassessing their activities in the Red Sea basin. Israel, too, needs to recognize the increasing importance of the Red Sea basin for its interests, due to the increase in the volume of Israeli shipping passing through this maritime lane and due to its being re-cast into the regional battlefield between itself and Iran. Based on this realization, Israel needs to shape its policy toward this region through paying close attention to all of the changes taking place within it and by monitoring the web of interests of the superpowers, the regional powers and the region's countries, while taking extra care to avoid being embroiled in regional conflicts or in the interests of the various players in the region.

As part of its policy making, Israel needs to realize that it cannot find its place within the Red Sea Basin via the existing frameworks of the two regional alliances, and that its status in the Horn of Africa is declining. This is evidenced in Eritrea's objection to Israel's joining the African Union as an observer, and the lack of progress in the normalization process with Sudan. Therefore, as the rest of the regional powers have been doing at this point in time, so should Israel reevaluate its policy and for the time being it should focus its efforts on strengthening its bilateral relations with the countries in the Horn of Africa while making a special effort in the coastal countries, Sudan and Eritrea. The admittance of Israel to the African Union as an observer could be very helpful in achieving this goal. Besides that, Israel can also make use of the Emirati military deployment in the southern Red Sea and in the Gulf of Aden in order to monitor the maritime traffic in the region. In this context, it should be noted that the Houthis have claimed that Israel has a presence in the Hanish Islands in the southern Red Sea, on Mayyun Island in the Straits of Bab el-Mandeb and on the Island of Socotra.

Maritime Security in the Gulf of Aden and Red Sea: The Role of the Gulf Cooperation Council (GCC)

Stephen Blackwell

Piracy and other interdictions of shipping remain a serious concern in the strategically vital shipping lanes in the Gulf of Aden and the Red Sea. In response to this threat, members of the Gulf Cooperation Council (GCC) have expanded and deepened their cooperation with regional littoral states in recent years. In the Horn of Africa, these countries include Djibouti, Eritrea, Ethiopia, Somalia, and the self-declared but internationally unrecognized state of Somaliland. Although pirate activity originating in Somali territory has abated in recent years, the danger to regional maritime security from the ongoing conflict in Yemen must also be considered.

This article first outlines the nature of the threats to maritime activity in the Gulf of Aden and the Red Sea from littoral states. It then examines the policies pursued by Saudi Arabia and the United Arab Emirates (UAE) as the two most active Arabian Gulf states in the area. The article will conclude with a discussion of how interregional cooperation between key GCC nations and regional states might help to stabilize the Arabian Peninsula's and the Horn of Africa's adjacent seas in the future.

Local Maritime Security Priorities

Protecting maritime traffic in the Gulf of Aden and the Red Sea is an issue of growing importance, given that shipping routed from the south to the Suez Canal must transit the Gulf of Aden and the critical chokepoint of the Bab el-Mandab Strait. The strait consists of a waterway that is only eighteen miles wide at its narrowest point between Yemen and Djibouti, with the route being further narrowed into two navigable channels separated by Perim Island. In 2018, a total of 6.2 million b/d of crude oil shipments passed through the strait according to the US Energy Administration.[1]

The security of the waters in this region is tied to the broader global and strategic importance of the Indian Ocean and east-west and north-south trading links. Within this broader regional context, the political and economic instability that has affected the states on both sides of the Gulf of Aden and the Red Sea presents an ongoing threat that requires concerted international and regional countermeasures.

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1 "The Bab el-Mandeb Strait Is a Strategic Route for Oil and Natural Gas Shipments", *US EIA*, August 27, 2019.

This is particularly the case with Somalia, which has lacked an effective central government since 1991. The fragmentation of local authority, absence of security governance, and persistent economic deprivation have created the circumstances whereby piracy has increasingly threatened shipping. The onset of an insurgency against the Transitional Federal Government (TFG) and subsequently the Federal Government of Somalia since 2006 led to increased attacks on shipping, which in turn provoked the creation of the Combined Task Force 150 anti-piracy coalition tasked with the mission to protect commercial shipping in the Gulf of Aden.[2]

There remains concern that international shipping in the Gulf of Aden is at risk of terrorist attacks stemming from the ongoing conflicts and instability in Yemen. On 3 March 2020, it was reported that three skiffs, one of which might have been an unmanned water-borne improvised explosive device (WBIED), attempted to attack a Saudi-flagged vessel sailing ninety nautical miles off the Yemeni port of Nishtun. On May 17, in a similar incident, two skiffs fired on a British-flagged chemical tanker en route from Al Jubail to the Red Sea. Security forces on the tanker responded by destroying one of the skiffs, which was suspected to be carrying explosive substances.[3]

The location of the attack ruled out activity by Houthi rebels, though the Houthis have also previously used WBIEDs in the Bab-El-Mandeb strait to specifically target Saudi vessels. Nevertheless, there are doubts over the presence of local terrorists with the capabilities to launch attacks such as those allegedly recorded in March and May 2020. Al Qaeda in the Arab Peninsula (AQAP) is notorious for its attack on the USS Cole in 2000 and two attacks near the port of Mukalah on the Southern Yemen coast in 2016. However, AQAP was effectively neutralized and broken up by UAE- and US-led counterterrorism operations when the port of Mukalah was pacified in 2016. Whether the Gulf of Aden skiff attacks were launched by residual terrorist cells or organized by an external power remains a matter of speculation at present.

Although instances of piracy have declined markedly in recent years, potential threats remain from both opportunistic raiders and terrorist and insurgent groups. Piracy has been largely suppressed by international initiatives such as the US-led Combined Task Forces and the EU's Operation Atalanta. Nevertheless, the United

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2 Robert M. Shelala II, "Maritime Security in the Middle East and North Africa: A Strategic Assessment", *Burke Chair in Strategy, Center for Strategic and International Studies (CSIS)*, February 6, 2014.

3 "A Gulf Between Narratives: Maritime Security in the Gulf of Aden in 2020", *Hellenic Shipping News*, June 26, 2020.

States Maritime Administration (MARAD) has continued to warn of the risk of pirate activity in the Red Sea and the Gulf of Aden. In the first eight months of 2021, seven instances of attempted or suspected piracy against shipping were recorded in the international recommended transit corridor (IRTC) in the region. MARAD also warned that merchant shipping remained vulnerable to unmanned aerial vehicle (UAV), limpet mine, and small boat attacks as well as military activity that might spill over from the ongoing civil conflict in Yemen.4

GCC Intervention

As well as protecting vital interests, increased involvement of Saudi Arabia and the UAE in the region adjacent to the Gulf of Aden and the Red Sea indicates a new assertiveness spurred by intensified geopolitical rivalries in the wider Middle East and North Africa (MENA) region. In addition, the growing involvement of both countries in the region is a reactive response to Iranian support for the Houthi rebels in Yemen.[5] In this context, Riyadh and Abu Dhabi are seeking to balance their traditional security and military relationship with the United States with growing energy and commercial links with China. The UAE in particular is seeking to position its expanding global logistics and shipping industry as an important link within China's Belt and Road project and the increased trade volumes anticipated between East Asia, Europe, and Africa.

In recent years, the expanding influence of Saudi Arabia and the UAE in the Horn of Africa has been manifested through a range of political initiatives, diplomacy, aid, and investment. In its bilateral relations with regional governments, the UAE in particular has sought political and security partnerships to build on traditional commercial ties symbolized by the Dubai-based DP World's development of the Doraleh port in Djibouti after 2006. In addition, Emirati diplomats mediated in the 2018 agreement that ended a twenty-year conflict between Eritrea and Ethiopia. Saudi and UAE aid was offered as an inducement for both sides to reach an accord.

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4 "MSCI Advisory 2021-009-Persian Gulf, Strait of Hormuz, Gulf of Oman, Arabian Sea, Gulf of Aden, Bab al Mandeb Strait, Red Sea, and Western Indian Ocean-Threats to Commercial Vessels", *US Department of Transportation, Marine Administration (MARAD)*, September 9, 2021.

5 Shady Ahmed Mansour and Yara Yehia Ahmed, "Saudi Arabia and UAE in the Horn of Africa: Containing Security Threats from Regional Rivals", *Contemporary Arab Affairs* 12, no. 3 (2019): 99–118.

Both Riyadh and Abu Dhabi have also intervened to ease tensions between Egypt and Ethiopia.[6]

However, relations between the Arabian Gulf states and the Somali government have been affected by rivalries between Saudi Arabia and the UAE on the one hand and Qatar on the other. The Somali government led by acting president Mohamed Abdullahi Mohamed ("Farmaajo") has been seen as being too dependent on Qatari investment and influence, with the result that the Saudis and Emiratis have instead sought to build security and trading relations directly with local authorities in Somalia's federal states. Following a contested election in Somalia in December 2020, there is a risk that renewed tensions could lead to further fragmentation of the state.

Prospects for Increased Interstate Cooperation

Given ongoing concerns over piracy, terrorism, and maritime security, there have been a number of initiatives to address these interrelated issues through regional cooperation. In particular, there have been calls for regional mechanisms to take the lead in neutralizing the threats posed by sub-state groups in the Gulf of Aden and the Red Sea. The challenge now is for those states concerned to facilitate the security of their adjacent seas as a key requirement for their economic development.

One important development for regional security has been the recent move to create a "Red Sea Forum" that has the potential to mediate disputes and address ongoing and emerging threats. However, a key question is the extent to which external powers should be permitted to shape a regime at the expense of the interests of the littoral states of the Gulf of Aden and the Red Sea. While the EU and China have suggested their support for a forum, there is skepticism over the extent to which the United States might become involved, a significant factor that indicates Washington's waning interest in acting as a security guarantor in sub-regions such as the Horn.[7]

Such a multilateral framework could offer a means of managing a range of issues including security, conflict management, trade flows, and migration. It could also provide a mechanism to enable African states to engage with Arabian Gulf actors to their mutual advantage. However, the efforts made to date suggest there are

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6 International Crisis Group, "The United Arab Emirates in the Horn of Africa", *Crisis Group Middle East Briefing*, No. 65, Abu Dhabi/Washington/Brussels, November 6, 2018.

7 Zach Vertin, "Toward a Red Sea Forum: The Gulf, the Horn of Africa, & Architecture for a New Regional Order", Brookings Doha Center Analysis Paper, No. 27, November 2019.

clear conflicts of interest between some of the potential main players in a projected regional forum. A joint Saudi Arabian-Egyptian initiative launched in 2017 led to a series of high-level meetings and ongoing engagement, though differences between the two governments also soon became apparent. By virtue of its geographic location, Egypt naturally sees itself as a pivotal regional actor through its links with both the Arab and African worlds and custodianship of the Suez Canal.

However, Egypt's move to create a regional forum reflects a defensive mindset in terms of safeguarding the country's position. Although the Sisi regime has cultivated a close relationship with and received significant funding from Saudi Arabia and the UAE, Egyptian policy suggests that Cairo is jealous about protecting its regional prerogatives from its Gulf allies. To this end, Egyptian diplomats have stressed that a Red Sea Forum's members should only include those states bordering the sea itself.[8]

In a fluid strategic context, multilateral security structures could secure shipping lanes from piracy and other threats. But it is arguable that the principle of "subsidiary" should be followed as much as possible in empowering local governments, institutions, and militaries to take responsibility for the region's security.[9] Given these concerns, key GCC actors such as Saudi Arabia and the UAE must tread a fine line in terms of encouraging regional cooperation without taking an overtly interventionist approach that might negate the progress already made.

Conclusion

Given the ongoing instability and economic dislocation in the Gulf of Aden and the Red Sea, there is a growing imperative for improved multilateral governance mechanisms to manage the full spectrum of risks that persist in the region.

The Gulf states' engagement in the Horn of Africa and its adjacent seas therefore derives from evident security, political, and economic imperatives. While a supranational "regime" could emerge given initiatives such as the Saudi-Egyptian Red Sea Forum, the precise shape of security governance in the region is still in a state of flux. Through measures to build multilateral cooperation on local maritime issues, the Arabian Gulf states could play an enhanced role in underpinning the security of the maritime routes through these strategically vital waters. The mediation with

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8 Gerald M. Feierstein, "The Impact of Middle East Regional Competition on Security and Stability in the Horn of Africa", Policy Paper, Middle East Institute, August 2020.

9 Demessie Fantaye, "Regional Approaches to Maritime Security in the Horn of Africa", *Friedrich-Ebert-Stiftung*, 2014.

Egypt, Ethiopia, and Eritrea has demonstrated the potential of Gulf involvement in this respect.

As a partial rapprochement between Saudi Arabia, the UAE, and Qatar is now in place, there is potential for the Gulf states to adopt a more coordinated approach to a range of regional security issues, including a resolution of the Yemen conflict, maintenance of the Ethiopia-Eritrea peace, and strengthening the authority of the Somali government as essential elements in securing the Gulf of Aden and the Red Sea.

Military Innovation on the Part of the Political Echelon – the Dolphin Submarines

Itsik Bilia

Introduction

Examination of the process which led to the delivery by Germany of the *Dolphin* submarines to Israel shows that Israeli politicians, and in particular prime ministers and ministers of defense, led to an innovative military concept of maintaining a set of submarines which would provide a continuous at sea deterrent. Those politicians realized that the need for submarines as a strategic system was vital for Israel, despite vociferous objections from the army chiefs, who preferred to invest resources elsewhere. This situation of disagreement between the political and military echelons, which led to military innovation is a familiar occurrence and the research literature has dealt with it. In this article, I shall present the theoretical model, alongside outstanding examples from world military history. Besides these, I shall analyze the Israeli case of the *Dolphin* submarines and the influence the political echelon had on their supply. Finally, I will briefly present another Israeli case, the Iron Dome project, which also demonstrates this kind of occurrence. [1]

What is military innovation?

The research discipline called military innovation is relatively new. What is military innovation? Adam Grissom distinguishes three components of military innovation: first, military innovation alters the way military frameworks function in the field. In other words, the military innovation has to find its expression in practical military activity, not merely as a bureaucratic improvement that has no effect on the battlefield. Second, military innovation has to be significant in its scope and impact. Minor changes cannot be regarded as innovation. Third, military innovation will inevitably lead to greater military effectiveness, where this is measured in the results on the battlefield. In other words, effectiveness which is expressed in battlefield performance at the tactical and operative level in terms of objectives accomplished, action time, casualties incurred to the forces in operation and to the enemy forces, etc. At the strategic level, one has to add the ability to retain deterrence vis-à-vis the

[1] There are other examples of strategic projects in the State of Israel which were the subject of considerable objections from the senior military command but which, through intervention of the political echelon, were carried out eventually – for example, the development of military satellites.

enemy over time. Grissom also introduces the different schools of thought which have emerged in an attempt to explain military innovation. The first focuses on the relations between the political echelon and the military echelon; the second focuses on inter-organizational politics, the third on intra-organizational politics, and the fourth on the organizational culture.[2] In this article, I will focus on the first model of military innovation – relations between the political and military echelons.

School of Political-military echelon relations-based military innovation

The school of thought on military innovation which is based on the relations between the political echelon and the military echelon was developed by Barry Posen. This school of thought claims that the relations between the political echelon and the military echelon are the significant factor in the formation of an innovative military concept. Posen bases his theory on study cases from the period between the two world wars, which include the doctrinaire changes which the armies of Britain, France, and Germany underwent. The British leaders were fearful of the German Luftwaffe attacks and pressured the military echelon to be innovative. As a result, the Royal Air Command set up an integrated, interlinked network of radars, Command & Control centers, and fighter squadrons which proved themselves in their counteracting the German aerial attacks on the British isle. The French political leadership, on the other hand, had failed in its attempts to press the French military toward innovation, which led to disastrous results when the German army invaded France and the French military was left with no countermeasure. On the other side, the German leaders were interested in a strategy of rapid conquest and pressed their military accordingly. The result was the Blitzkrieg – the famous combat doctrine which proved itself in their subduing of large swathes of Europe. According to Posen, the key to military innovation is through intervention of the political echelon in forming the military doctrines. This is usually done with help from officers within the military. Only thus can the military organizations be prodded into action, since they tend normally toward fixation in their positions.[3]

Grissom assembles additional examples of this model from other researchers. Edmund Beard's research, which deals with the development of the intercontinental ballistic missile system in the US Air Force, supports this model. Beard describes how a political appointment within the Air Force Secretariat, along with pressure

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2 Adam Grissom (2006) The future of military innovation studies, *Journal of Strategic Studies*, 29:5, 905–934.

3 Barry R. Posen, *The Sources of Military Doctrine: France, Britain, and Germany Between the World Wars* (Ithaca, NY: Cornell University Press, 1984).

from the Eisenhower administration to appoint certain officials, led to the historic shift in the US Air Force's concept and its preference of strategic bombers. Had it not been for the intervention of politicians, the US Air Force had planned to continue developing new generations of strategic bombers and would not have transitioned to develop strategic ballistic missiles. All this happened despite the doubts which arose as to the ability of the bombers to survive against the Soviet anti-aircraft systems in comparison with ballistic missiles, which exhibited better performance.[4]

There were also politicians in the Soviet Union who led to a change in military concepts during the Cold War. Senior politicians and officials pressed the military elite to design the appropriate Soviet response to NATO's new plans, such as the Flexible Response.[5] They did this by creating informal alliances with the military elite in order to drive the military forward and to advance their policy. Generally speaking, the standing of politicians in their debates with the military elite prevailed and had a great influence on the Soviet planning at the tail-end of the Cold War.[6] This model finds its expression also in the battle against non-government organizations and guerilla groups. A study which compared between the United States' inability to cope successfully with the counter-uprising in Vietnam, and the relative success of the British in their Boer Wars in South Africa, concludes that due to structural differences in the political systems in the two countries, British Prime Minister Lord Salisbury was given the flexibility and freedom of action to replace senior commanders in waging the war. On the other hand, US Presidents Kennedy and Johnson had to resort to micromanaging the fighting in Vietnam, and this prevented innovation. This means that the relations between the political echelon and the military echelon affected military innovation.[7] Grissom concludes that there are many examples in which intervention by the political echelon is what led to military innovation, and that had the political echelon not have intervened, the military would have been left trapped in its original concept.

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4 Edmund Beard, *Developing the ICBM: A Study in Bureaucratic Politics* (New York: Columbia University Press, 1976).

5 Flexible Response is a nuclear strategy in which tactical nuclear weapons are used, allowing limited damage and avoiding total destruction of the enemy. This strategy was adopted by NATO as a way of dealing with the quantitative advantage of the Warsaw Pact armies.

6 Kimberly M. Zisk, *Engaging the Enemy: Organization Theory and Soviet Military Innovation 1955–1991* (Princeton University Press, 1993).

7 Deborah D. Avant, *Political Institutions and Military Change: Lessons from Peripheral Wars* (Ithaca, NY: Cornell University Press, 1994).

The First Dolphin Submarines

Already in the 1960s, the Israeli Navy had active submarines, but these were old models dating back to the Second World War, which had been renovated for the Israeli Navy. Beginning in the mid-1970s, the Israeli Navy operated a small fleet of submarines, consisting of three German-designed submarines built for Israel in shipyards in England. The new *Gal* Series submarines gained operational successes during the First Lebanon War, successes which increased the submarines' prestige in the minds of the military and political echelons. In the mid-1980s a task force was set up to plan the requirements for the next generation of submarines. Initially, attempts were made to build them in the United States and, after this failed, German shipyards were approached in an effort to harness the American aid money for this purpose. In the summer of 1989, Minister of Defense Yitzhak Rabin approved the project with the shipyards in Germany in the face of objections from the General Staff and the contract was signed in February 1990. The rise of the threat from the East, in the form of Saddam Hussein and his large army led the then-Deputy Chief of Staff Ehud Barak and others in the IDF elite to suspend the submarine project and prioritize force building which in their mind was more appropriate to cope with the Iraqi army. Barak preferred to invest the American aid money in the procurement of fighter jet squadrons and other means, and persuaded the then-Minister of Defense Moshe Arens to stop the submarine project while the penalties for project cancellation were still low. Thus, the decision remained until the expiry of the deadline agreed with the Germans and the contract was canceled in November 1990.

The preparations for the war in the Gulf diverted attention toward acquisition of other military capabilities and suspended the option of purchasing the expensive submarines. Following the outbreak of the Gulf War and the striking of Israeli population centers by Iraqi Scud missiles in January 1991, German Foreign Minister Hans-Dietrich Genscher arrived in Israel for a visit and met with Minister of Defense Moshe Arens.[8] He offered Arens German assistance in rebuilding the wreckage and in compensating those affected, but Arens rejected the offer and asked for real support for Israel's security, saying "We need two German submarines". Genscher, who was shocked by the string of tragic events in Israel, replied that he had no authority on this matter and promised to get back with an answer as soon as possible. A few days later, the German Military Attaché invited an Israeli delegation to Bonn

[8] The following descriptions are based on an interview I held with Hanan Alon on June 21, 2021. Alon was in charge of foreign relations in the Ministry of Defense between 1986 and 1992 and was head of the Ministry of Defense delegation in Germany between 1992 and 1997. The interview was held as part of my final research project.

to present Israel's requirements for military assistance. A delegation was formed in the Ministry of Defense, headed by Hanan Alon, Head of the Foreign Relations Division. Arens instructs Alon that the submarine issue was the most important and Israel was prepared to purchase the two submarines if Germany would agree to spread the payments over many years with favorable credit terms. In addition to the submarines, Israel requested Fox chemical warfare agent detection vehicles, lending of Patriot Missile batteries to reinforce the aerial defense system, a powerful radar, medicines, etc. Ahead of their departure, Haim Israeli, who had been the assistant Minister of Defense from back in David Ben-Gurion's days, showed the head of the delegation Alon the draft Israeli request which appeared in the protocol of the famous New York meeting in 1960 between Prime Minister Ben-Gurion and German Chancellor Konrad Adenauer, which included the original request for three German submarines. The delegation arrived in Germany and they were led straight to the office of Chancellor Helmut Kohl. The head of the Israeli delegation Hanan Alon with Israel's ambassador Binyamin Navon beside him, described the hard feelings in Israel when it transpired that German companies were involved in developing weapons for Saddam Hussein's army. How embarrassing was it for Germany that Jews, survivors of the German gas chambers, were sitting in airtight rooms wearing gas masks against missiles which German companies helped to build. Eventually, despite initial objections to the supply of submarines on the grounds that they were not related to anti-missile defense, the Chancellor became convinced that this was the hour the German commitment to Israel's security was being put to the test and he agreed to supply two submarines for Israel, to be fully paid for by the German government. The surprise in Israel was great and Arens couldn't believe his ears when Alon reported the German consent and the financing that went along with it.

The Dolphin II Submarines

In 2002, Prime Minister Ariel Sharon and Minister of Defense Shaul Mofaz decided to enlarge the submarine fleet from three to five vessels. This decision is of the utmost importance in all matters related to maintaining a continuous at sea deterrent capability, in other words, the ability to keep at least one operational submarine at sea at all times. This decision of the political echelon was met with resistance from Chief of Staff Dan Halutz. In an interview with Ehud Olmert, who was a minister and Deputy Prime Minister in the Sharon Government, he said that Sharon and Mofaz understood the importance of the submarines from the strategic standpoint and approved ordering two additional submarines from Germany in order to reach a fleet of five submarines. Chief of Staff Halutz, on the other hand, objected and claimed that a fourth submarine would be sufficient. When Sharon became incapacitated

and Olmert took over as acting Prime Minister, Halutz requested another discussion. Olmert believed the information had not changed and in view of Sharon's and Mofaz's vast military experience when compared with the IDF elite at the time, which was in his mind less experienced, he decided to approve the order for the two additional submarines, thereby completing the fleet of five submarines.[9] In addition, the first *Dolphin* submarines were only capable of remaining under water for a limited length of time since they were forced to come up for snorkeling,[10] which could potentially expose the submarine. The next generation of Israeli submarines included a combination of an advanced *AIP-Air Independent Propulsion* system, freeing it from the dependency on outside air and enabling the submarines to remain submerged for longer periods of time. This is a system comprised of fuel cells made by the German Siemens Company, which enable electricity to be generated silently by converting chemical energy into electric energy. This system is combined with the conventional Diesel-electric power, thereby prolonging the time the submarine is able to remain submerged. Such a capability of the submarine flotilla increases the submarine's stealth and resilience.[11]

Advantage of the political echelon in identifying a paradigm shift

In the case of the Israeli *Dolphin* submarines from Germany, the innovative concept of Israeli politicians, mainly Prime Ministers, came to the fore, having realized that the need for submarines as a strategic system was vital for Israel, despite vociferous objections from the army chiefs, who preferred to invest resources elsewhere. The case of the *Dolphin* submarines is an example of innovation in the military concept originating in the political echelon, rather than in the military echelon. Here too, one can suppose that the submarine fleet would have looked very different had it been up to the IDF alone. Former Navy commander, Admiral Ami Ayalon suggests an explanation for this: "The army is charged with preparing for war and is therefore occupied with aspects of an operative and tactical nature – it's all about winning naval battles and achieving superiority in the naval arena. When the submarine medium gained strategic importance and the potential for coping with an existential threat, this was a paradigm shift to which the army, being a large organization, had difficulty adjusting."

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9 Interview with former Prime Minister Ehud Olmert dated May 23, 2021. The interview was held as part of my final research project.

10 Snorkeling is the function of a submarine when it rises close to the surface or uses a pipe as a sort of snorkel to capture oxygen with which to operate the Diesel engines and charge the batteries which will be powering it when diving deeper.

11 For more information on this propulsion method: Air Independent Propulsion.

The ability to maintain a military response when the entire area of the State of Israel is under severe missile and rocket threat, and bearing in mind Israel's relatively small dimensions and the limited number of air fields, the naval branch becomes the leading option for response and deterrence. The optimal possibility for preserving the retaliatory capability is in the sea. In this context, there is a conflict between the army's operational considerations, which are focused on winning the next war's battles, and strategic considerations of the political echelon, which is occupied with the question of the security and continued existence of the State of Israel. The *Dolphin* submarines rate differently in the priorities of the political echelon than in the priorities of the military echelon.[12]

Iron Dome as another example

Dr. Uzi Rubin, who was head of the "Homa" ("Wall") administration, which deals with the ballistic threat and is today a researcher in the Jerusalem Institute for Strategy and Security, examined the events which led to the development of the Iron Dome system in his doctoral thesis. He describes how the threat from rockets being fired from the Gaza Strip and Lebanon, and the results of the Second Lebanon War, affected the Israeli politicians' awareness of the threat rockets posed to the Israeli home front.[13] The then Minister of Defense Amir Peretz, asked the Directorate of Defense Research and Development (DDR&D) in the Ministry of Defense to evaluate various options for coping with the rocket threat. There were several options on the table: the Iron Dome system from Rafael, which is based on launching interceptor missiles; the Skyguard system from Northrop-Grumman, which is based on a chemical laser; and a system of rapid-fire, radar-guided cannons from Raytheon and Lockheed Martin. The minister of defense formed a committee, headed by the scientific deputy head of the DDR&D to examine the various options. The committee selected Iron Dome as the most suitable solution. There were many opponents to the Iron Dome system. Some had links to the alternative solutions, mainly Skyguard, and some were senior members of the military echelon who thought that active defense was a mistake. There are several reasons for the objections from the military echelon. Some considered this system to be an expensive, unnecessary system since the rocket threat was considered a tactical, not strategic threat to the State

12 Interview with former Navy commander Admiral Ami Ayalon from April 25, 2021. The interview was held as part of the research report I wrote.

13 "The Israeli security forces' ability to adapt to revolutionary changes in the strategic environment: Active defense as a case study", Bar-Ilan 2018. This study was published as part of his book *From Star Wars to Iron Dome: The Battle over Active Defense in Israel*, published by Efi Melzer, 2019 [Hebrew].

of Israel and therefore there was no reason to invest so many resources to solve a tactical problem. They believed it was preferable to dedicate these resources to the operational and strategic levels. Minister of Defense Amir Peretz, who is himself a resident of Sderot – a front-line community – disagreed with this opinion and regarded this threat, both from the Gaza Strip and from Lebanon, to be a strategic threat for which Israel had to prepare with all its existing means. Another source of resistance was a military concept of the IDF senior command, that active defense would result in a situation where the offense value, which is an overriding value in the IDF, would be degraded due to the diversion of the precedence to defense. Senior commanders were worried about the implications of using such a system on the desire to directly confront the rocket problem. Senior officers spoke out against the Iron Dome system even after it had exhibited impressive performance during Operation Protective Edge. They claimed that Iron Dome was "the new Maginot Line" since it had the same disadvantages: astronomical cost at the expense of assault resources, creating a false sense of security and atrophy for the military's offensive thinking.[14] Of course budgetary considerations were also on the minds of the objectors since this meant lengthy development requiring hundreds of millions of Shekels in investment spanning development through to procurement and maintenance. There were also senior Air Force officers who considered this an impractical solution and even one which would endanger the activities of the Air Force aircraft. The political echelon disputed the military's position and insisted on pushing forward with developing an active defensive solution. A good example that demonstrates the disparity between the political echelon's point of view and that of the military echelon's, can be seen in Ehud Barak's activity. While he was serving as Chief of Staff, he objected to a solution that would be based on active defense as a matter of principle. After he succeeded Amir Peretz as minister of defense, Barak became a supporter of the development and procurement of the Iron Dome system. Barak even found a way to harness the United States to take part in financing the Iron Dome project, thereby reducing the tensions with the IDF heads over the issue of budgeting this system.

Conclusion

The procurement of advanced submarines, which operate in secret, and which are capable of lengthy underwater stays, provides Israel with strategic depth. It seems that Israeli politicians noticed the importance of this system, which directly

[14] Brigadier-General (Res.) Dr. Meir Finkel, Iron Dome – The New Maginot Line? *Ma'arachot*, 461, June 2015 [Hebrew].

influences the battlefield and provides a continuous at sea deterrent. The IDF senior command, on the other hand, objected to this system. they considered it to be superfluous, with no direct influence on military victory in the next war and a waste of considerable resources, which should be directed toward systems of higher operational importance. This innovativeness in the military concept came from the ministers of defense and prime ministers who had to face off the IDF senior commanders and insist on having this system. Had this matter been left to the army chiefs alone, it is doubtful whether the State of Israel would have had a sufficient number of submarines to enable continuous at sea deterrent. Likewise, regarding an aerial active defense system, the likes of Iron Dome, which provides protection for the home front with its high percentage of rocket interceptions. I have no intention in this article to reach a decision in the dispute, which is still simmering, over the negative effects of using the Iron Dome system, however there is no doubt as to the military innovation it brings to bear both technologically and conceptually. These two innovative military concepts, continuous at sea deterrent and active defense are the outcome of the political echelon's intervention despite objections from the military echelon to these concepts. The two concepts represent military innovation since each one alters the way military frameworks function in the field. They are both significant in their scope and lead to increased military efficiency, which is measured in the results on the battlefield. Both the above cases add on to other examples cited in the research literature, which represent the model of political-military echelon relations and its effect on military innovation.

Section 3: The Maritime Domain – Economic Aspects

This section deals with economic aspects of the maritime domain in the Middle East. It includes articles on the blockage of the Suez Canal for six days in March 2021 by the Ever Given container ship, which emphasized the importance of the Canal on the one hand and its vulnerability on the other hand, as well as the cost of blockages for global trade; the Exclusive Economic Zones in the Red Sea, which thanks to the energy resources creates opportunities but also risks, and attracts both regional powers and superpowers; Israel's goal of producing 30% of its energy from renewable energy sources but is far from meeting; and the first year of the Chevron Corporation in the Israeli energy market, with the difficulties that were already exposed and the future opportunities that are worth taking advantage of.

The Incident of the Suez Canal Blockage by the *Ever Given* Container Ship – The Implications for the Region and for Israel

***Ehud Gonen*[1]**

The sequence of events in the March 2021 Blockage of the Suez Canal

On March 23, 2021, the *Ever Given* container ship, which was passing northwards through the Suez Canal, ran aground on the banks of the Canal about ten km north of the Port of Suez. The Canal got blocked as a consequence, and shipping through the Canal was stopped in both directions for almost six days.

The *Ever Given* is a megaship built in 2018 with a gross tonnage of 219,079 tons and operates under a Panama flag. It is about 400 meters long and 59 meters wide. It was carrying goods worth billions of dollars in 18,300 TEU out of its maximum carrying capacity of 20,000 TEU.[2] The ship is owned by the Japanese Shoei Kisen corporation, managed by the Taiwanese Evergreen Company, and is insured against third party damages by the UK Club insurance organization.[3]

While sailing through the Canal, the ship swerved toward the bank of the Canal, its bow hit one bank while its aft swung to the opposite bank so that the ship totally blocked the passage. The official reason for the accident was not made public, however it is possible that the prevailing weather conditions at the time were the cause of the accident, since strong winds were blowing perpendicular to the ship, and sandstorms restricted visibility.

Following the blockage, hundreds of ships of various kinds got stuck inside the Suez Canal, in the Bitter Lakes and also at the north and south entrances to the Canal. Realizing that it would take a long time to release the ship, numerous ships changed course and opted for the route circumnavigating Africa, rather than sailing through the Canal. These were ships which were at this decision point along their voyage in the Indian Ocean, and were geographically in a place that enabled altering the course southwards. Ships that were already in the Red Sea and ships in the Mediterranean continued along their course and waited in the ports of Port Said and in the Gulf of Suez.

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1 The author wishes to thank Dr. Elai Rettig, Captain Alex Gerson and Dr. Benny Spanier for their professional assistance with this article.

2 TEU – Twenty-foot equivalent unit.

3 The data are from the shipping data website MarineTraffic.com.

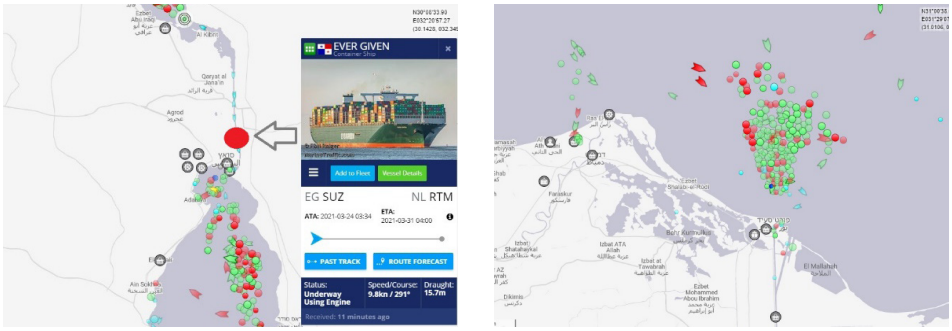

Figure 1: Left, the Ever Given (red dot) stuck approximately 10km north of the southern entrance to the Suez Canal and a queue of hundreds of ships waiting in the Gulf of Suez for the ship to be freed. Right, a similar queue of ships waiting at the northern entrance to the Canal opposite Port Said (source: screenshot from the Marine Traffic website).

This marine "traffic jam" was only fully uncorked about one week after the ship had been freed. While the traffic in the Canal was resumed, the Egyptian authorities impounded the *Ever Given* to investigate the incident and placed the responsibility for the heavy damage incurred to the *Suez Canal Authority* (loss of revenues and the cost of releasing the ship). The ship anchored in the Bitter Lakes area for 106 days and was only allowed to sail on on June 6, 2021 after an agreement was signed between the Canal authorities and the ship owners. The details of the agreement have not been made public.

The canal blockage incident and the delays to global and regional trade it caused aroused a public discussion over the importance of free, uninterrupted shipping to international trade and to economic prosperity. In a world where the global economy and the manufacturing value chain straddles the entire globe, there is a brisk trade in both finished goods and in semi-finished goods (products which are transported from one production site to another all over the world). Therefore, the canal blockage impacted not only trade in finished goods from the manufacturing centers to the markets, it also had an immediate impact on the industrial manufacturing processes in many countries due to the "just in time" method of industrial production processes and inventory management practices.[4]

[4] This is an inventory management method in which the components for the manufacturing process are received from the supplier when they are needed, rather than being stored in a warehouse on the manufacturer's premises.

Specifically, the Suez Canal was expose as a significant choke point, mainly in the trade between Asia and Europe, and raised the need to consider alternative routes in order to reduce the dependence on the Suez Canal passage.

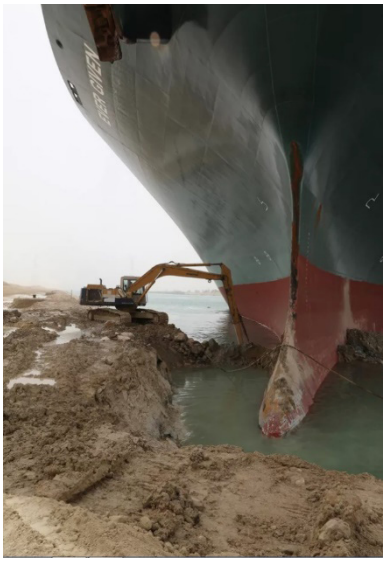

Figure 2: a lone bulldozer attempting to free the huge ship stuck on the Canal banks (photo credit: Suez Canal Authority – SCA)

The Suez Canal and Global Trade

The Suez Canal, which was first opened in 1869, is one of the world's most important shipping lanes. Passage through the Canal shortens the sailing distance from the Straits of Malacca to Rotterdam (the largest port of entry into Europe) by approximately 3,500 nautical miles and it also shortens the sailing distance from the Straits of Malacca to the ports on the United States eastern shore (see figure 3). In 2019, before the outbreak of the COVID-19 pandemic and its disruption of the global economy, approximately 13% of the world's trade passed through the Suez Canal[5] in 18,880 ships (an average of 52 ships per day), which carried cargoes weighing 1,031 million tons.[6] During the first half of 2021, the traffic through the Canal increased drastically (despite the blockage event which lasted six days). Between January and June 2021, 9,763 ships passed through the Canal, a 2.3% increase compared to 2020.

5 SCZone head: 13% of world trade passes through Suez Canal, *Hellenic shipping news*, June 24, 2019.

6 SCA Navigation Statistics.

The net cargo weight that passed through the Canal grew in the first half of the year by 3.8% to 610.1 million tons, compared to 2020.[7] It appears that 2021, despite the Canal blockage incident, will be the most successful year in the history of the Canal from the financial perspective.[8]

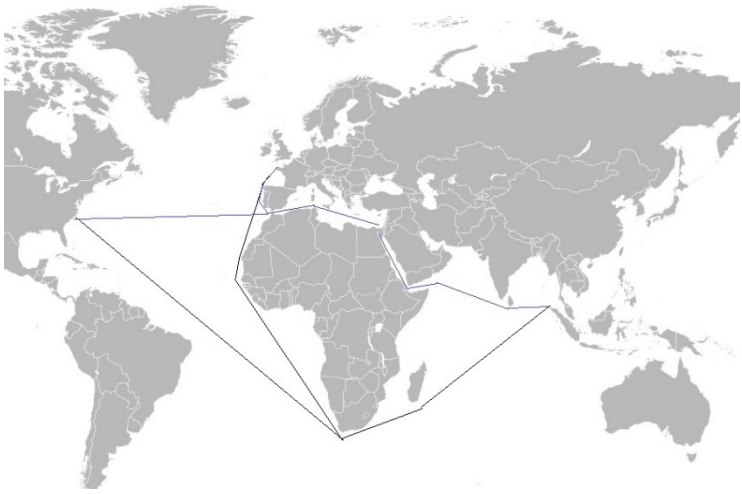

Figure 3: the navigation routes from the Straits of Malacca to western Europe and to the United States eastern seaboard via the Suez Canal and bypassing the Canal

In 1956, the canal, which was under British ownership and operation, was nationalized by the Egyptian President at the time, Nasser, and since then it is operated by the Suez Canal Authority (SCA). Egypt's revenues from the canal are extremely significant and stood at approximately $5.84 billion during the 2021–2020 fiscal year, accounting for approximately ten percent of the total revenues of the Egyptian government and approximately 2% of the total Egyptian GDP. This is a fixed, stable source of revenues in foreign currency (exporting services), which are of the highest priority to the Egyptian economy, which is beset by numerous structural difficulties.

In 2014, Egyptian President Abdel Fattah al-Sisi announced a national project of widening the Canal, which was completed within just one year in 2015. The project, which was carried out and financed in full by Egyptian internal sources and accompanied by the expression of intense national sentiments, doubled the northern section of the Canal over a length of 70 km (out of a total Canal length of

7 Egypt's Suez Canal reports record revenue despite blockage crisis, *AlJazeera*, July 11, 2021.

8 Ibid.

approximately 200 km). Today it is also integrated with the construction of industrial parks,[9] which take advantage of the existing workforce in Egypt on the one hand, and the logistical accessibility to the world's main trade routes on the other. The doubling of the canal project is also combined with the New Egyptian Administrative Capital project. The Canal is a primary national symbol in Egypt, whose roots go back to those days when it was nationalized by Nasser and the canal widening project harped on those same national sentiments.

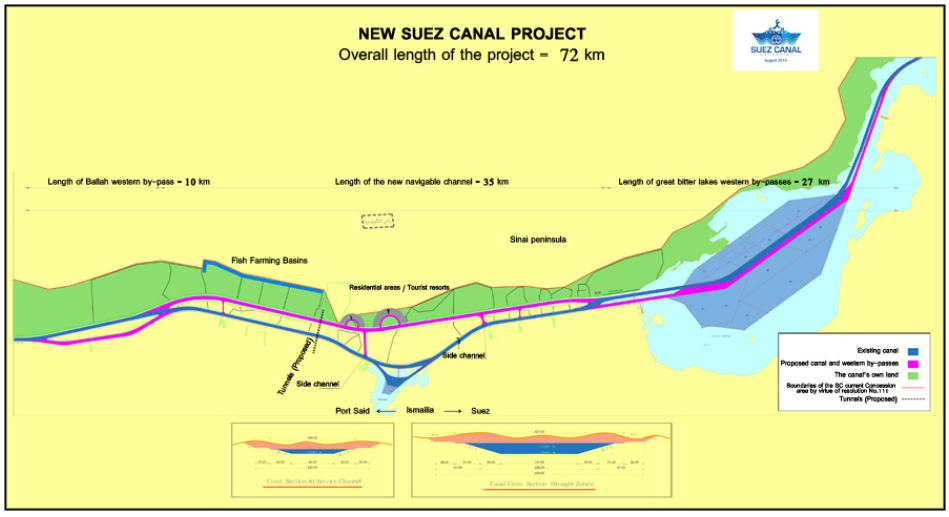

Figure 4: The area of the widened Suez Canal north of the Bitter Lake (source: Suez Canal Authority)

Legal Aspects

The Canal blockage incident by the *Ever Given* placed the issue of responsibility of Compulsory Piloting on the agenda. This responsibility lies with the ships crossing the Canal and also, to an extent, placed the Egyptian authorities in a rather unflattering light. Since Egypt requires whoever passes through the Canal to use SCA pilot services, the question regarding the Canal authorities' accountability, and that of the Egyptian pilot, has been asked following the accident.

According to international law, the Canal is an internal waterway, meaning that all of the Egyptian laws apply to those passing through the Canal. The passage regime in the Canal was set in the Convention of Constantinople (1888) and in addition

9 Suez Canal Area Development Project, Great Egyptian Dream.

there are specific Egyptian laws governing the Suez Canal, starting with the decree nationalizing the Canal (1956) and other laws from 1975, 1998,[10] and also other general commercial laws.[11]

After the ship was extricated from its location, the Canal authorities impounded the ship in the Great Bitter Lake area and set a price of approximately $916 million as the price for releasing it as compensation for the damages caused to the Canal through loss of revenue, release costs, financial damage and damaged reputation. The ship's insurer, the UK Club, named this as an unacceptable demand. The Egyptian authorities later lowered their demands to approximately $550 million. Upon releasing the ship in July 2021, the Canal Authority chairman Admiral Osama Rabie said that the parties (the Canal Authority and the ship owners) have no more claims from one another.[12] On another occasion the Chairman of the Canal Authority said that the compensation agreement includes the purchase of a tugboat for the Canal. However, the details of the final agreement that was signed in early July between the owners and the insurer on the one hand, and the Canal Authority on the other, remain confidential.

The private international law (Conflict of laws) governing orts is complicated. According to past precedents, which go back as far as the 19th century, there apparently is no unequivocal legal grounds for the Egyptian authorities to claim torts from the ship owners directly in case of damage during a voyage under a compulsorily-piloted journey under international law. However, the law (or more precisely certain concepts of the law) allow for "personification" of the ship and claiming torts from the ship itself even in a case of compulsory pilotage.[13] On the other hand, the rules of navigation of the Suez Canal Authority explicitly state (Art., 4(1) – Responsibilities) that the vessel and its captain are responsible for any damage that may be caused when navigating through the Canal.[14] In addition, in terms of the accountability of the Egyptian pilot stationed on board the ship according to Egyptian law, the pilot bears no responsibility for damages in case of an accident.

10 Canal Treaties & Decrees.

11 Egyptian Maritime Trade Law No. 8 for the year 1990.

12 Egypt's Suez Canal reports record revenue despite blockage crisis (Video), *AlJazeera*, July 11, 2021.

13 Dennis M. Robb, (1974) "The Compulsory Pilot Defense: A Reexamination of Personification and Agency," *University of Chicago Law Review*, Vol. 42(1), Article 8, pp. 199–215.

14 Rules of Navigation, Suez Canal Authority, August 2015 (p. 6).

This lies fully on the ship's captain even in the event of a mistake on the part of the Egyptian pilot.[15]

This is not the place for an exhaustive legal discussion, in particular since the issue never actually reached the courts in Egypt and the ship was ultimately released with a confidential agreement. However, certain media outlets claim that such conduct on the part of the Egyptian authorities – including slashing the claim amount in half – presents Egypt in an unflattering light and as a country operating non-transparently and even resorting to blackmailing methods.

Operating the navigation of a ship through the Suez Canal and Calculating the cost of passage

In terms of ton-mile cost (the cost of transporting one ton of merchandise a distance of one mile), maritime shipping is the most effective mode of transport over long distances. This is why approximately 80% of world trade in terms of weight is transported by sea (and the rest by air, overland and through pipelines). This efficiency of maritime shipping increases as the distance the merchandise travels increases. Therefore, in the longest and most congested shipping lines in the world between northeast Asia and Europe, with the existing railway technology overland transport via the vast expanses of steppes in central and western Asia cannot possibly serve as an economical, efficient substitute for maritime shipping.

Another main parameter in the logistics of trade is the transfer of cargo from one means of transport to another and transshipment[16] of cargo between two of the same means of transport. Generally speaking, it can be said that any transfer of cargo from one means of transport to another considerably increases the shipping cost.

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15 Liability: Pursuant to the Egyptian Maritime Code No. 8 of 1990 (Art. 279) as well as rulings of the Supreme Court in Egypt, the responsibility for pilotage operation in port and in the Suez Canal lies entirely with the Master of the guided vessel even in case of the pilot's error. In this context one can mention the ordinance from 1939 issued by the British High Commissioner to Palestine, which is still practiced in Israel and in many other countries. According to "the Damage by Vessels under Pilotage Ordinance": "Notwithstanding anything contained in any Ottoman law or in any other law or Ordinance the owner or master of any vessel under pilotage, whether compulsory or otherwise, shall be answerable for any loss or damage caused by the vessel or by any fault of the navigation of the vessel".

16 Transshipment: in the maritime context, transshipment is transfer of a container from one ship to another. The transshipment is usually done at a transit port between the port of origin and the destination port of the merchandise.

An outstanding and extreme example of this commercial principle can be seen in the trade between Europe and Asia, beginning in the 16th century, with the discovery of the maritime route from Europe to Asia by *Vasco da Gama.* Trade, which until then passed through the Mediterranean and continued in overland caravans through Egypt and in ships to India came to a halt, and instead the trade was diverted to the long route circumnavigating Africa. The Cape of Good Hope route included only a single vessel from Europe to India with no loading or unloading and without an overland component, and was therefore much more efficient despite the considerable added distance (approximately 3,500 nautical miles). This efficiency eventually resulted in the demise of the trading city-states like Venice, which had dominated the Mediterranean trade which dwindled in favor of the trade route to India through the Atlantic Ocean.

This being said, however, despite the great efficiency of the maritime trade, the Canal blockage incident raised the need to consider additional trade routes, which might be less profitable but which provide redundancy and will enable trade to continue even in case of a major shipping lane being blocked. For this, the cost of sailing along the various routes and the cost of passage through the Suez Canal needs to be considered, as well as other possible overland routes, pipelines for fluid commodities, etc.

The passage through the Canal shortens the maritime voyage from east Asia to Europe by about 3,500 nautical miles, which are equivalent to 8 to 12 sailing days. The exact number of days saved is calculated as a function of the ship's speed, which is determined by a number of factors.[17] The cost of a day of sailing can vary between a few thousands of dollars and tens of thousands of dollars.[18] In other words, the cost savings gained from shortening the journey time, for example by approximately ten days saved by traversing the Suez Canal, can vary between a few tens of thousands of dollars for small ships and hundreds of thousands of dollars for a large, modern ships.

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17 The ship speed is determined by mechanical factors such as type of engine, ship structure, environmental factors like weather and administrative factors like captain decisions to increase or decrease speed, instructions from the owners of the cargo regarding the urgency of the ship's arrival, etc.

18 The per-diem cost depends on numerous factors such as ship size, ship type, ship launch date, type of charter etc. (in general there are two kinds of charter: time charter – meaning chartering the ship for a fixed term, and voyage charter, meaning chartering the ship for a voyage from a port of departure to a destination port. It is also possible to charter a ship under various charter models, such as bareboat charter, etc.).

On the other hand, the passage through the Suez Canal is not free. Egypt, through the Suez Canal Authority, charges a hefty fee for each passage and it is reasonable to assume that this payment is determined by the abovementioned alternative cost of circumnavigating Africa. The cost of a passage in the Canal for a large container ship can add up to hundreds of thousands of dollars.

The container megaships being built in recent years, with capacities in excess of twenty thousand TEU, are faster and can sail at speeds of more than 20 knots. At such speeds, the time saving afforded by the Suez Canal is less than a week, meaning that the alternative cost of a Suez Canal passage is reduced.

Beyond the direct monetary aspect, the passage through the Suez Canal also allows for greater certainty as to the costs of the voyage and its duration, since the weather when circumnavigating Africa can make it difficult to meet the planned voyage schedule. In order to meet the schedule in case of bad weather, the captain might have to increase speed, meaning increased fuel consumption and increased wear on the ship's systems.

The high costs of Canal passage, which in certain cases come close to the alternative route circumnavigating Africa, make the shipping companies consider the worthwhileness of the Canal passage. Shipping companies, primarily in the container sector, which operate fixed-frequency lines with periodic port calls will of course prefer passing through the Canal since the savings in time mean they need a smaller total number of ships for the total circuit. For example, for a weekly service between Japan and Europe, at least eight ships would be needed (four weeks for each direction). Extending the duration of the voyage by two weeks due to the Africa circumnavigation means each one-way journey would take six weeks, or 12 weeks for the full circuit, meaning it would be necessary to operate 12 ships in order to keep up the same service level.[19] Also owners of sensitive cargos or cargos with relatively short lifetimes will prefer to sail through the Canal – for example cargos of agricultural produce, livestock, refrigerated goods (food, medicines etc.), and so forth. It is commonly assumed that all time-sensitive goods would prefer the Suez Canal crossing.

Cargo owners and ship owners that transport the rest of the types of goods will do a financial feasibility calculation before crossing through the Canal. Sometimes, under depressed prices in the commodities market, cargo owners will prefer the long

[19] This is only an example. The shipping companies cope with the scheduling issue also by setting up 'alliances' and other forms of collaboration.

African circumnavigation in order to gain time and wait for the prices to recover. On the other hand, the Suez Canal authorities are quite flexible when setting the cost of passage and they grant "discounts" to certain ships according to the prevailing market conditions. For example, a discount for ships carrying liquefied natural gas (LNG) when prices in the natural gas market are low. This is done in order to encourage them to use the Canal for passage in any case.[20]

Suez Canal Blockage

Ships pass through the Suez Canal in convoys. The ships wait in the Canal termini at Port Said in the north and in Suez in the south (the wait usually lasts a few hours). When there are enough ships waiting, the convoy gets underway where a local Egyptian pilot boards each ship (this is a requirement of the Egyptian authorities) and a tugboat escorts the convoy.

The convoys depart concurrently from the north and south and pass each other in the Bitter Lakes, where the Canal opens into a wide waterway. After having completed the doubling of part of the Canal in 2015, convoys can sail concurrently in opposite directions through the stretch where there is a double canal.

The Canal blockage by the *Ever Given* occurred in the section where there is no double canal. This highlighted the vulnerability of the trade route, which passes through the Suez Canal bottleneck and raised dire concerns as to the continuity of navigation along this route in case the Canal will be blocked for longer periods of time. In all its 150 years in operation, the Canal had remained closed for eight years between 1967 and 1975 due to wars between Israel and Egypt (from the outbreak of the Six-Day War in June 1967 to June 1975, while the negotiations over the Interim Agreement were suspended). The second time it was shut down to navigation was on account of the *Ever Given*.

There are three conceivable reasons why the Canal might be blocked to navigation:

1. **Operational and safety reasons**: as was the case with the *Ever Given*, meaning a ship running aground, cargo overboard blocking the Canal, availability issues with the tugboats that accompany the ships in their crossing, etc. In view of the dramatic increase in the size of container ships, which have reached Mega Container Ship proportions, it appears that the operational risks in managing such large ships in general, and in narrow passages like the Suez Canal in particular, are on the rise due to the fact that their size leaves no margin for error in such

20 Suez Canal extends discounts for LNG carriers, *Sea trade Maritime News*, September 17, 2019.

a narrow waterway. The sides of such a mega-ship, along with the thousands of containers on board, form a formidable huge wall, making them exceptionally difficult to navigate in case of strong wind shear. In recent years there have been other events and accidents which resulted in the loss of thousands of containers when the container hold collapsed in the ship, container fires which destroyed entire ships, etc.[21] Events of this kind occurred also years ago, however the increased size of the ships means that nowadays, when such an incident occurs, the damage, both direct to the cargo and to the ship, and indirect – for example to the environment – are immeasurably greater. Also the amount of hazardous materials these megaships carry is greater, with potential for touching off a significant safety incident.

2. **Force Majeure**: ranging from temporary conditions like the local weather through to catastrophes like earthquakes or tsunamis, which could disable the Canal.
3. **Security and political causes**: for example, the past wars between Israel and Egypt or a terrorist attack. In this context it must be noted that Egypt is indeed engaged in a battle against radical Islamic terrorist organizations throughout the country, and in the Sinai Peninsula in particular. The terrorist organization *Ansar Bayt al-Maqdis* which is operating in Sinai and which has sworn allegiance to ISIS, has in the past launched severe terrorist attacks against the Egyptian Army and even against IDF soldiers on the border with Egypt (2012) and fired rockets at the city of Eilat (2017). Between 2012 and 2013, Egypt reported foiling attempts to attack Canal shipping.[22] It is likely that the sinking of one large vessel (or more than one, in case of a mega-attack) in the Canal will results in months of blockage. However, considering the fact that the digging of the New Suez Canal, 70 km in length, took just one year, it is likely that even in an extreme scenario of deliberate blocking of the Canal, the Egyptian authorities (perhaps with international assistance) would solve the problem in a matter of a few months.

It is very difficult to estimate what the long-term effects of a protracted blockage (months) of the Suez Canal would be. Yet, an analysis of the costs and behavior of global shipping in the case of the *Ever Given*, makes it safe to assume that in the short term there would be a sharp spike in the costs of maritime transport, plus a degree of increase in the prices of goods and products. The rise in the prices of maritime haulage prices would be caused by the diversion of maritime transportation from

21 Among the most outstanding accidents in just the past two years one can mention the collapse of hundreds of containers on board the ONE Apus, the fire on the decks of the X-Press Pearl in Sri Lanka and the fire on the decks of a container ship in the Port of Dubai.

22 Egypt attack on Suez Canal ship 'foiled', *BBC News*, September 1, 2013.

other regions around the world toward the Asian-European trade in order to complete the periodic calls as described above. The rise in product prices would primarily be the result of the uncertainty effect, of the opportunity to raise prices even if the actual costs have not really risen (consumers understand and accept the rise of prices due to a large-scale event like the Canal blockage).

In the medium and long term, it is likely that the market will stabilize around a new permanent situation (a "new normal"), and to the extent that such an extreme event can be analyzed, one can deduce that the costs of shipping between Asia and Europe will increase, albeit not drastically, since for part of the goods, already today the costs of passage in the Canal embody, to an extent, the alternative costs of circumnavigating Africa.

At the same time, certain goods, which are sensitive to the voyage duration, might endure a sharp rise in prices due to the need to transport these cargos by air or by high-speed ships, which incur high fuel consumption costs. Or in some cases, the inability to transport the goods over maritime routes altogether.

Some countries would be severely affected by such a future long-term closure, first and foremost Egypt. The revenues from the Suez Canal are extremely vital to the Egyptian economy. Hundreds of thousands of jobs are created by and around the Canal (tens of thousands of employees in direct employment and more in the other circles of employment in the industrial parks adjoining the Canal). In the second circle would be the Eastern Mediterranean countries like Israel, Cyprus, Greece, and Malta, which will find themselves far from this major global shipping lane, which today passes along the shortest line between Port Said on the northern outlet of the Canal and the Straits of Gibraltar. Malta, for example, is a major transshipment hub in the central Mediterranean. This transshipment activities contribute immensely to the economy of this small island. Should global trade switch to the route around Africa instead of passing through the Mediterranean, Malta's economy would be severely affected since the volume of transshipment in the island-nation's ports would be slashed drastically.

The connectivity of the ports in Israel would also be affected by such a hypothetical future blockage: they would find themselves far from the world's main shipping routes. This would lead to negative impacts on Israel's foreign trade, since the import and export costs would increase. Figure 5 presents two shipping lanes. On the right is the main lane between Asia and Europe nowadays through the Suez Canal (marked in black). The Israeli Mediterranean ports of Ashdod and Haifa are approximately one hundred nautical miles from this route (marked in yellow). On the left is the

route around Africa in case the Suez Canal is blocked (marked in black). The Israeli ports would now be 2,700 nautical miles from the route (marked in yellow).

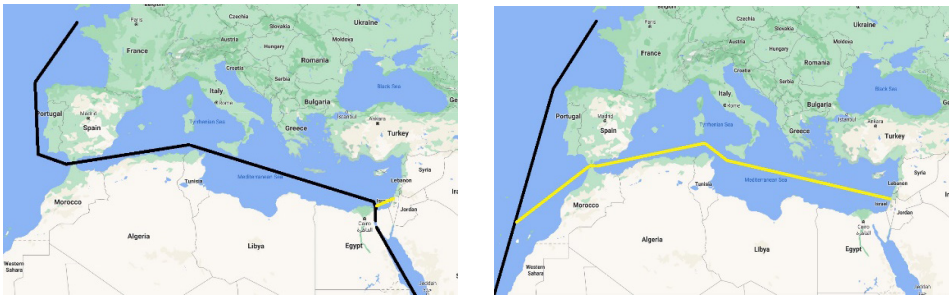

Figure 5: Right, the main trade route from Asia to Europe via the Suez Canal, Left, the global trade route around Africa

Alternative routes

The Suez Canal creates a maritime trade link between the Mediterranean Sea and the Indian Ocean. This issue of connecting the trade routes between the Mediterranean Sea and the Indian Ocean has occupied the minds of the region's rulers, merchants and sailors for thousands of years. Evidence of attempts to connect the Nile River eastwards to the Red Sea, thereby forming a maritime route between the Mediterranean and the Red Sea, has existed since the time of the Pharaohs.[23] In the Roman era, trade between the Mediterranean basin and Asia passed through Egypt via overland routes before continuing onwards by sea. It was France which succeeded in completing this massive project of digging the Suez Canal, which was first opened in 1869.

Any future alternative route would have to deal with the economy of scale of the trade via the Suez Canal. The average cost of transporting a container through the Canal stands today at approximately $25–35,[24] compared with hundreds of dollars it would cost to transport the same container via overland routes by truck or train.

23 Suez Canal... A Historical Evolution, Suez Canal Authority.

24 To do a rough calculation, we can use a 6,000-container ship, which pays approximately 200,000 dollars in passage fees through the Suez Canal, which are equivalent to 33.3 dollars per container crossing through the Canal.

Besides the Suez Canal, several alternative routes can be taken into consideration between the Mediterranean and the Indian Ocean (both existing and future routes).[25]

Oil Pipeline Network

There are two active oil pipelines between the Red Sea and the eastern Mediterranean. The first is the SUMED pipeline,[26] which was laid between the City of Suez and Alexandria after shipping was blocked in the Suez Canal following the Six-Day War (June 1967). The pipe began operations in 1978. The second pipe is the EAPC (Asia-Europe Pipeline Co), formerly the Eilat-Ashkelon Pipeline) between Eilat and Ashkelon in Israel. In addition, there is a pipeline between Iraq and Ceyhan in Turkey. Although this pipeline does not originate in a sea port in Iraq, but rather from the Kirkuk region, it does help reduce European dependence on tanker passage through the Straits of Hormuz and the Suez Canal in the oil trade between the Persian Gulf and Europe. In addition, there is the route of the oil pipeline between Iraq and Syria, which has been inactive since 2003 and the oil pipeline from Iraq to Haifa, which has not been used since 1948.

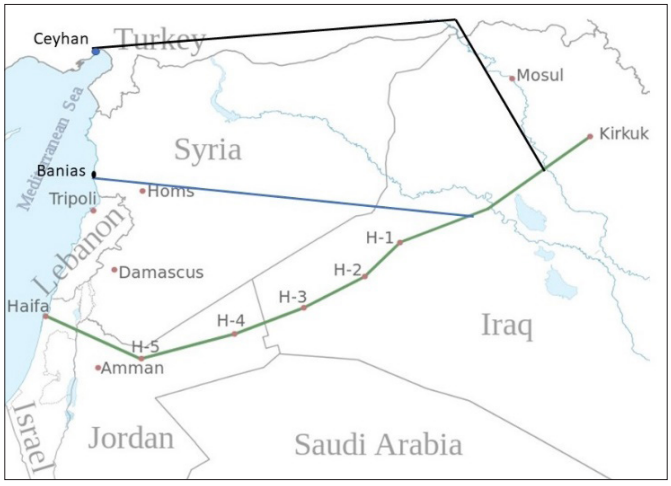

Figure 6: Oil pipelines from Iraq to the Mediterranean, the Kirkuk-Haifa (Israel) line, the Kirkuk-Banias (Syria) line which branches off it, and the Kirkuk-Ceyhan (Turkey) line (Drawn by the author)

25 For a complete review, see: Ehud Gonen, Logistic Corridors between the Indian Ocean and the Mediterranean – Existing trade routes, planned ones and China possible future involvement, in: Shaul Chorev and Ehud Gonen (eds.), *Maritime Strategic Evaluation for Israel 2020/21*, pp. 336–354, University of Haifa.

26 SUMED – Suez Mediterranean pipeline

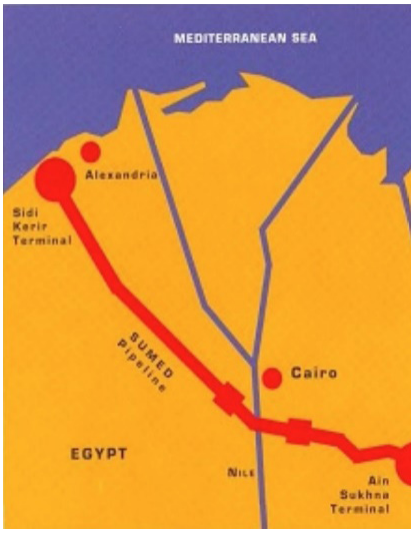

Figure 7: Route of the SUMED oil pipeline from Suez to Alexandria (published by the Netoil Company which built the pipeline).

In 2017, 9% of the global trade in oil products passed through the Suez Canal and the SUMED pipeline.[27] In recent years there is an upward trend in the oil traffic from north to south, primarily oil from Russia and the United States to destinations in East Africa and South Asia, in addition to the "traditional" oil traffic from the Gulf states to Europe.[28] The data go on to show that in 2016 (the last year verified data were released by the US Energy Information Authority), approximately 30% of the oil passing from Suez to the Mediterranean passed through the SUMED pipeline and the remaining 70% passed by tanker.[29] Israel does not publish data on the oil traffic in the EAPC.

Overland connection in the Levant

Theoretically, it would be possible to transfer goods between the Mediterranean and the Indian Ocean by unloading and loading in the ports of Eilat and Ashdod in Israel, and transporting the cargo between these two ports on trucks. While this route

27 The Suez Canal and SUMED Pipeline are critical chokepoints for oil and natural gas trade, US Energy Information Administration, July 23, 2019.

28 In this context, it must be noted that due to the sanctions imposed on Iran, which have meant a decline in European imports of Iranian oil, have resulted in a decline in the oil movement from south to north via the Canal and via the SUMED pipeline.

29 World Oil Transit chokepoints, US Energy Information Administration, July 25, 2017.

did indeed operate on a small scale in certain periods, the unloading and loading, and then the truck-borne transport, is an inefficient proposition for very large-scale trade. There is a plan in principle to link the city of Eilat and its sea port with a railway line to Israel's national railway network, however it seems this project is still very far from materializing for economic, environmental and social reasons.[30]

Another overland link is connection of the continuation of the Valley Train Line in Israel to the Jordan border crossing (the Sheikh Hussein Bridge), and from there via a future railway south toward Aqaba or east toward the Gulf States via Saudi Arabia. This link would enable trade between the Kingdom of Jordan with Europe, without having to pass through the Suez Canal (Jordan's only outlet to the sea is the Port of Aqaba on the Red Sea). Economically this is a very attractive proposition, however it encounters political hurdles due to the political situation between Israel and Jordan.

It should also be noted that Iran is working to build an overland corridor, based on an ethnic Shiite continuum (referred to as the '*Shiite Crescent*') from the northern Persian Gulf to the Syrian coast. The motivation for building this logistical corridor, however, is mainly political – to support Hezbollah in Lebanon and to prop up the Syrian regime – and not commercial, in support of global trade.

The northern route

Figure 8: The northern route versus the Suez Canal for trade between the Far East and northwestern Europe.[31]

30 Gad Lior, The train to Eilat is not in Minister of Finance Avigdor Lieberman's work plan: "It isn't viable", *YNET*, July 12, 2021 [Hebrew].

31 What is the Northern Sea Route?, *The Economist*, September 24, 2018.

It is possible that, due to global warming, new seasonal shipping routes will be opening up between northeast Asia and western Europe via the Arctic Ocean.[32]

Despite the economic attractiveness of this route (as opposed to the dire consequences of global warming), large-scale trade in the Arctic Ocean is still a long way off since there are substantial logistical hurdles to overcome for shipping in that region (there are no major ports anywhere along the way to provide technical support), legal difficulties due to various claims being made by the countries in the region (mainly Russia) and also very strict environmental regulation.

Overland Link via Central Asia

In 2013, China announced its Belt and Road Initiative, which is intended (inter alia) to build physical and logistical connectivity between the countries throughout the Eurasian region that have signed up to the initiative. A significant part of this building of connectivity is intended to rebuild the ancient overland trade routes (the Silk Road) from China through Central Asia en route to Russia and Europe.

As part of this initiative, China is investing billions of dollars in building railroads over enormous distances in central Asia, on the way overcoming engineering challenges and political instability in some of the countries in the region. At the same time, despite these mega-investments, trade by railway over long distances cannot compete with the economic efficiency of maritime transport. A large part of the trade being done over the newly-opened land routes is transacted thanks to generous government subsidies provided by China. These accounted for over 50% of the cost of the transport and nowadays they account for "only" a third of the transport cost.[33]

The Belt and Road Initiative was intended, inter alia, to stimulate China's economic development in its western provinces, which are far from its prosperous eastern seaboard cities, to check internal migration from the west eastwards, and through a supportive economic policy, to help deal with internal political problems with ethnic minorities on western China. All these, from the domestic Chinese perspective, justify these far-reaching subsidies. Besides, one can think of certain scenarios, for example for certain goods produced in western China which are destined for inland cities (for example Moscow, the large city in Europe with 12 million inhabitants). In such cases,

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32 For more on this, see Tzevy Mirkin, The Russian Northern Sea Route – Declarations and Reality, in: Shaul Chorev and Ehud Gonen (eds.), *Maritime Strategic Evaluation for Israel 2018/19*, (Haifa: University Haifa, 2019), pp. 118–127.

33 Huilin Shi, Is the elimination of Chinese subsidies a good idea? *railfreight.com*, January 11, 2021.

a direct westward overland journey by train would be cheaper and more efficient than a lengthy journey to the Chinese east coast, then by sea to European ports and from there transshipment overland or by river boat to landlocked destinations.

Nevertheless, besides these specific cases, for the bulk of Chinese exports produced in the large economic centers on China's eastern shores, maritime trade was and remains the most efficient, cheapest means of transport to the international markets.

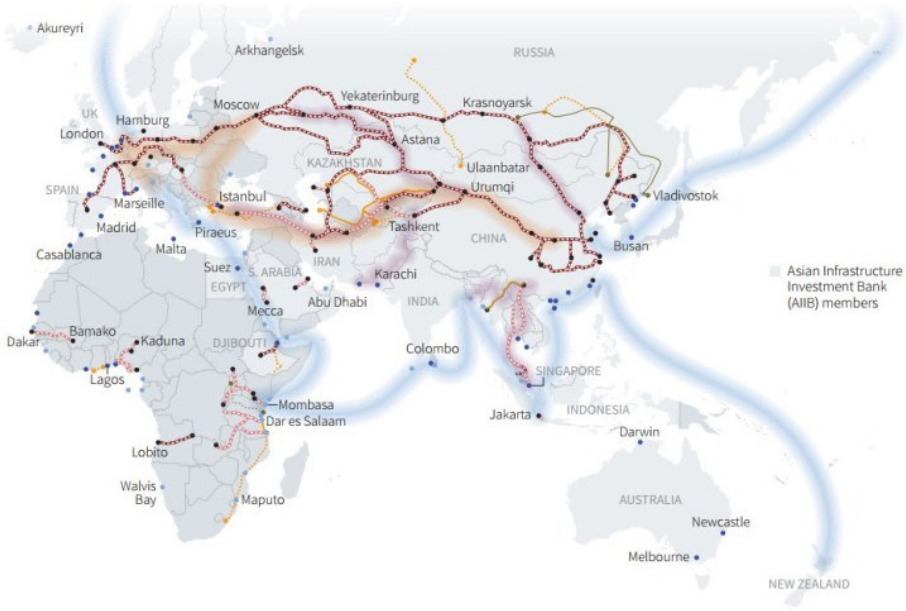

Figure 9: Logistical Corridors between China and Europe under the Chinese Government's Belt and Road Initiative (BRI).[34]

Another overland route between east and west Asia is the Trans-Siberian Railroad. Russia is trying to sell this train line mainly to customers in Japan, who are offered a ferry line between Japan and Vladivostok in the Russian Far East and from there via the Trans-Siberian Railroad to eastern Russia and onwards to Europe. However, it seems that despite a measure of attractiveness this journey has to offer, which under certain circumstances can even be shorter than the maritime journey, bureaucratic and administrative obstacles in Russia, plus the limited transport volume, make this route unattractive.

34 Mercator Institute for China Studies (MERICS).

Conclusion

One of the reasons for blocking the Suez Canal in the first place, and certainly the main reason for the great difficulties in releasing the *Ever Given* is the huge size of the container ships which are being built this past decade – larger than aircraft carriers. With the opening of the new ports in Israel (the Haifa Bay Port and the South Port in Ashdod), such megaships will be calling in Israel at relatively high frequencies. This fact has numerous economic and commercial benefits to it, but at the same time it is worthwhile to prepare (and we hope this is being done) for safety incidents inherent to these megaships. Safety incidents and hazardous materials are present in any case, but these are exacerbated due to the sheer size of the ships. It seems that Egypt, with assistance from the international community, ought to take a close look at the safety aspects of the passage of ships in the Canal and also evaluate the shipping safety of these megaships elsewhere around the world.

At present there is no alternative overland Asia-Europe route for large-scale trading in goods (which are not oil in a pipeline). On the other hand, the world's reliance on maritime transport ensures that at least for the foreseeable future the Suez Canal will continue to serve as a significant shipping route of considerable importance. The only "threat" to the Suez Canal's preeminence as a main commercial link in the Asia-Europe trade is the opening up of the northern route to large-scale trade on the tail of global warming, however even the opening up of this route has its problems and it will be a long time before trade there will gather significant momentum.

The Suez Canal is vital to the Egyptian economy. It is a key service export sector especially now with global tourism in freefall due to the COVID-19 pandemic; in view of Egypt's demographic and economic situation – a population of over one hundred million of which approximately forty percent are under the age of twenty and an (official) unemployment rate of ten percent; plus the past experience of the Muslim Brotherhood movement's election victory (2012), provide the west with a clear interest in the continued operation of the Suez Canal, which on its part is helpful in preserving the stability of the regime in Egypt.

Israel has a clear economic interest in maintaining the Suez Canal as a major world shipping route. The proximity of Israeli ports on the Mediterranean coast (Haifa and Ashdod) to the northern outlet of the Suez Canal (160 and 105 nautical miles respectively) enables Israel's foreign trade to benefit from a high degree of connectivity thanks to this proximity to a main trade route. Therefore, beyond the overriding consideration of security in the Sinai Peninsula vis-à-vis Israel, there is also a secondary economic consideration in support of collaborating with Egypt

in eradicating terrorism in the Sinai Peninsula which will also assure the continued trade via the Suez Canal.

The Ministers of Transport in Israel have promoted the railway connection of the Port of Haifa through the Beit She'an region to Jordan, and have branded this initiative in various ways. For instance, *Tracks to Peace* under Minister Israel Katz and the *Bay to Gulf* initiative of Minister Miri Regev. In any case, and regardless of the branding, such a project has tremendous regional development potential, mainly with Jordan, and it could curry sizable European support thanks to the logistical redundancy it presents for passage through the Suez Canal. It is recommended that the railway to Jordan initiative continue to be promoted as opposed to a railway line to Eilat, which is more problematic from the environmental, transport (loading the railway systemin the center of the country) and demographically (transforming the city of Eilat from a tourist city to a logistic city). The promotion of the railways project eastward past the Israeli border has to be coordinated with Egypt in order for them not to feel that the railway lines are supplanting the passage through the Suez Canal, and to make it clear that there is no intention to harm the Egyptian economy.

Exclusive Economic Zones (EEZ) in the Red Sea Region: Risks and Opportunities[1]

Shlomo Guetta

Introduction and Main Points

The Middle East has been endowed with various natural resources, including plentiful energy resources in the form of crude oil and natural gas fields. Many energy resources in the region are located at sea or near the coastal shelf. The maritime region in which the energy resources are found is referred to in professional circles as the Exclusive Economic Zone – EEZ. In this article we shall also use the term Economic Waters. This is a relatively new term that entered maritime law in the course of drafting the Convention on the Law of the Sea in 1982. This is a maritime region which can span a strip of up to 200 nautical miles in width from the baseline (the country's coast), within which the country has sovereign rights to explore and exploit natural resources, both living and non-living, on the seafloor, and also to carry out prospecting activities and economic exploitation such as energy production from currents, winds and water. A state is permitted, but not required, to declare exclusive economic zones.[2] Throughout the Middle East region, there are three maritime spaces in which there are EEZ's: the Persian Gulf and the Gulf of Oman; the eastern Mediterranean; and the Red Sea.

In my opinion, the Economic Waters within the Red Sea region have not been adequately reviewed relative to the other two regions. In view of the increasing importance of the Red Sea, it is advisable to shed some light on this region and expand on the information regarding the energy potential within the maritime medium of the Red Sea – a zone which has been developing in recent years, including regarding natural gas resources.

So far, the Red Sea has functioned as a main transit route for energy shipments. Nowadays the sources from which energy is extracted are in the sea itself. This change is expected to radically alter the definition of the Red Sea Basin and its importance. On the one hand, it may be holding the seeds of a great promise and prosperity for all of the countries in the Basin, but on the other hand, it might also turn into a source of disputes and power struggles, especially when considering the battle raging between the superpowers and the regional powers over hegemony in the region.

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1 The topic of the article is very dynamic. It reflects the situation at the time of writing in November 2021.

2 For more on the term EEZ, see Sarah Weiss Me'odi, *Maritime Law*, clause 21.7

Regardless of the Economic Waters issue, the Red Sea serves, now as in the past, as a bustling sea route for goods and energy from the Far East to Europe and vice versa. In recent years, the interest and attention regarding the Red Sea has increased due to violent conflicts unfolding within it, in particular regarding the Red Sea, and in particular regarding a strategic threat to one of the world's most critical choke points at the southern outlet of the Red Sea, namely the Straits of Bab el-Mandeb.

The concern is that the freedom of navigation in this important strait will be curtailed due to actual hostile activities – related to the protracted civil war in Yemen, increasing penetration by Iran, which is supporting the Houthis – one of the toughest factions opposing the official government in Yemen – to the southern Red Sea, and concerns of maritime terrorism and piracy in this region.

Also in the background is the growing tensions between Egypt and Ethiopia (the latter being a landlocked country following the breakaway of Eritrea), following the construction of the Renaissance Dam in Ethiopia – a dam which Egypt views as a severe threat to the water reserves it needs in order to exist as a country with a large population.

The goal of this article is to shed light on the Economic Waters within the Red Sea and, in the process, to point out some fundamental data, varying details and the implications in terms of challenges and threat profiles regarding the countries bordering the Red Sea Basin. The first part of the article will review the fundamental factors in terms of maritime borders between the various countries, disputes or understandings and agreements. The second part will review the current activity regarding the actual or potential exploitation of the offshore energy resources. The final part will present an analysis of the implications and challenges facing the region's countries within the general context and within the specific context of exploiting the energy resources.

Geographic Fundamentals

Agreements, understandings and disputes concerning the demarcation of the Economic Waters and the maritime boundaries within the Red Sea

The unique geographic structure of the Red Sea,[3] as a kind of 2,250 km (1215 nautical miles) long inlet from the Indian Ocean, allows in principle for a relatively straightforward division and demarcation of the Economic Waters zones between

3 For more on this see Benni Ben Ari's article, The Geography of the Red Sea. *The Strategic Series 2020* (Haifa: Chaikin Chair for Geostrategy, University of Haifa, 2021) pp. 82–106 [Hebrew].

the various countries along its coast. There are two strategic choke points at both ends of the Red Sea, –in the south, Bab el-Mandeb, a narrow strait connecting the Gulf of Aden to the Red Sea, and in the north, the Suez Canal.[4] The Red Sea has Egypt, Sudan and Eritrea on its western shores, with Djibouti straddling the southern tip of the Sea just west of the Strait of Bab el-Mandeb. On the eastern shores lie Saudi Arabia, which has the longest stretch of coastline along the Red Sea. Yemen lies to the south of Saudi Arabia while on the northern tip of the Gulf of Aqaba lie Jordan and Israel. The latter two do not have any mineral resources on the northern Gulf of Aqaba-Eilat.

Besides the importance of the Red Sea as a strategic shipping lane connecting the trade between three continents (Asia, Africa and Europe) between the Indian Ocean and the Mediterranean, it is home to a rich and diverse ecosystem, which has been endowed with deposits of oil and gas, and therefore the demarcation of its economic waters is of importance.

The countries on the western shores of the Red Sea

Egypt shares the longest common maritime boundary in the Red Sea with Saudi Arabia. This shared border is approximately 910 km long (approximately 490 nautical miles). It extends from the north of the Gulf of Aqaba down to the center of the Red Sea (latitude 22 degrees). An agreement was signed between the two countries in April 2016, regularizing the maritime border between them. This took place during Saudi King Salman's visit to Egypt, during which several investment projects were announced (see Figure 2). In the joint communique issued in Cairo, they said: "This [agreement] enables both countries to benefit from the exclusive economic zone for each, with whatever resources and treasures they contain".[5] Based on this agreement, and as will be discussed later on, in the recent two years the two countries have begun taking measures to realize the energy potential within their respective exclusive economic zones.

An interesting point, which can be observed in the map of the agreement between Egypt and Saudi Arabia, is that the Egyptian side includes the maritime region of the Hala'ib Triangle – an area disputed between Egypt and Sudan (see Figure 3). It is likely that the marking of the maritime border opposite the Hala'ib Triangle was

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4 For more on the Red Sea's characteristics, see: Benni Ben Ari and Moshe Terdiman's article, Geography and Strategy in the Red Sea – the Current Situation, In Shaul Chorev and Ehud Gonen (eds.), *Maritime Strategic Evaluation for Israel 2020/21* (Haifa: Maritime Policy and Strategy Research Center, University of Haifa, 2021) pp. 99–124.

5 Reuters Staff, Saudi, Egypt draw up maritime borders, *Reuters*, April 9, 2016.

introduced following a demand from Egypt, which has been claiming sovereignty over that area ever since Sudan achieved its independence in 1956. The area is rich in iron ore, gold, magnesium and other natural resources. In the past, the Sudanese government granted a Canadian company a concession to explore oil in the waters off the Hala'ib Triangle shores, a fact which inflamed tensions between Egypt and Sudan.

Figure 1: General map of the Red Sea, demarcating the Economic Waters of the countries bordering its shores

Figure 2: Map of the maritime boundary agreement between Saudi Arabia and Egypt from 2016

Sudan Nowadays, due to their common interest against Ethiopia's Renaissance Dam, the relations between Sudan and Egypt have warmed slightly, although it is still not clear whether this will at last bring about a settlement of the dispute between them over the Hala'ib Triangle. In any case, in tenders for natural gas exploration, which the Egyptians issued in 2019 in the Red Sea, the maritime region off the Hala'ib coast was included in the list of sites ("blocks") on offer. Contrary to the Egyptian position, the Economic Waters map claimed by Sudan shows that the maritime region opposite the Hala'ib Triangle is included in the Sudanese demand (see Figure 4). Beyond the Hala'ib Triangle, Sudan, which is also situated on the western shores of the Red Sea, shares a maritime border with Saudi Arabia, which is located on the eastern seaboard of the Red Sea. The maritime boundary shared between Sudan and Saudi

Arabia spans a stretch of approximately 440 km (approximately 240 nautical miles), not including the Hala'ib Triangle.

Figure 3: Map of the Hala'ib Triangle

Figure 4: Map of the Economic Waters claimed by Sudan

Eritrea is located on the southwestern shores of the Red Sea. It achieved its official independence in 1993 when it seceded from Ethiopia. Eritrea shares a maritime boundary with Sudan to the north, while opposite lie two countries along the eastern coast of the Red Sea – Saudi Arabia and Yemen (see Figure 5). The maritime boundary between Saudi Arabia and Eritrea is a stretch of approximately 320 km (approximately 170 nautical miles). In 1999, Eritrea and Yemen signed a treaty settling their maritime boundary in a section of approximately 380 km (approximately 205 nautical miles) (see Figure 6).[6]

The Republic of Djibouti is south of Eritrea, on the western shores of the Red Sea on the way to the Gulf of Aden. It gained its independence from France in 1977. Djibouti is on the southwestern side of the Straits of Bab el-Mandeb. Its southeastern border is with Somalia. Regarding the small Republic of Djibouti, no data or visual information was found as to the Economic Waters belonging to this country, nor were any claims, made by Djibouti in this regard, found.

6 For more on the maritime boundary treaty between Eritrea and Yemen, see: Award of the Arbitral Tribunal in the second stage of the proceedings between Eritrea and Yemen (Maritime Delimitation) Decision, vol. XXII, pp. 335–410, December 17, 1999.

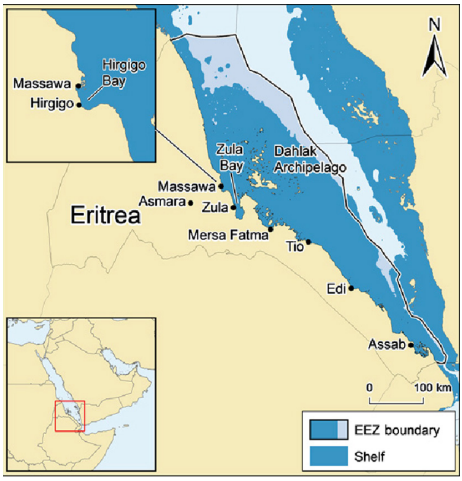

Figure 5: Map of the Eritrean Economic Waters

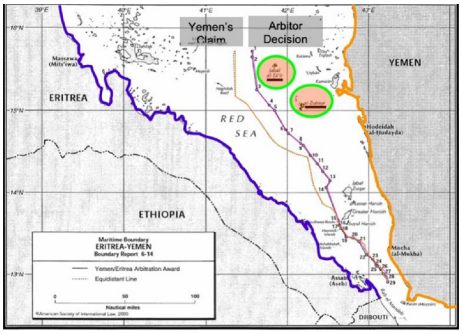

Figure 6: The compromise agreement on the shared maritime boundary between Yemen and Eritrea from 1999

The countries along the eastern shores of the Red Sea

Saudi Arabia is located on the eastern side of the Red Sea and has the longest coast along this sea (including the Gulf of Aqaba) compared with the rest of the countries bordering it. Its shores span approximately 1,670 km (900 nautical miles). It borders Yemen to the south, which is currently being torn apart by a prolonged bloody civil war. The region along the Red Sea between Saudi Arabia and the Straits of Bab el-Mandeb are controlled by the Houthis, currently propped up by the Iranians. The Houthis are a bitter adversary of the central government both in Yemen and in Saudi Arabia. As for the demarcation of the Economic Waters between Saudi Arabia and Yemen, there are no known disputes. However, this issue is marginal nowadays in view of the violence and hostilities between the warring parties in the Yemeni civil war, where the Saudis support the central government, while the United Arab Emirates support the separatist Southern Transitional Council in South Yemen. The armed conflict in this region has its manifestations in the maritime space as well, including the use by the Houthis (with considerable support from Iran and Hezbollah) of naval mines, missiles, UAV's, suicide boats and various other weapons launched against shipping, infrastructure, and port installations along the Saudi coast.

Yemen is the result of the unification of North and South Yemen in 1990. It has a coastline that stretches between the shorter portion along the Red Sea as far as the Straits of Bab el-Mandeb and the longer portion on the northern coast of the Gulf of Aden. As for the Yemeni stretch of coastline in the Red Sea south of the Saudi coast

and opposite the Eritrean coast, an agreement had been signed in 1999 between Yemen and Eritrea, demarcating a shared maritime boundary of approximately 380 km.

To sum up this section, the countries along the Red Sea coast have for the most part settled the maritime boundary between them, and therefore it is generally quite clear how the Exclusive Economic Zones (EEZ) are divided between them. The only exception is the disputed region of the Hala'ib Triangle between Egypt and Sudan, along the 22 degrees northern latitude. The southern section where Yemen borders Saudi Arabia is unclear as well, in view of the civil war which is still raging there and the splitting of the Yemeni coast between several factions which control it.

Actual Realization of the Energy Resources in the Red Sea

Of the countries reviewed in the previous section, which dealt primarily with the demarcation of the maritime boundaries between them, Egypt and Saudi Arabia are the only countries[7] which are actually exploiting the energy potential within their territories through the extraction of crude oil over several decades, while recently they have begun exploring for and extracting natural gas.

Egypt – Energy Fields in the Gulf of Suez

Egypt has been extracting crude oil since the early 1900s. Over half of Egypt's oil reserves are in offshore oil fields, primarily in the Gulf of Suez. Egypt is an important energy producer which is not a member of OPEC.[8] Commercial amounts of oil were first discovered in 1908. Additional discoveries were made in the late 1930s along the Gulf of Suez coast and within the waters of the Gulf itself.

Egypt extracted crude oil from offshore installations in the Gulf of Suez, with the most prominent and widely-known being the oil fields dubbed Morgan, Belayim and July. During the Six-Day War (June 1967), Israel conquered the Sinai Peninsula and began extracting crude oil from the "Oil Corridor" on the eastern coast of the Gulf of Suez: the Abu Rodeis site, Ras-Sudar, Abu Zenima and a cluster of offshore

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7 To be precise, Sudan, in the late 1950s, attempted to explore oil through the AGIP company along its Red Sea coast, with no meaningful results History of Oil Exploration in Sudan, *Republic of Sudan Ministry of Energy & Oil*. 50 years later (in 2010), Sudan announced that it would be searching for oil in the Red Sea waters with the help of the China National Offshore Oil Corporation, however it is unknown whether this initiative was indeed pursued. Sudan starts oil exploration in Red Sea, *The European Coalition on Oil in Sudan.*

8 Organization of the Petroleum Exporting Countries – OPEC.

production facilities known as Belayim. Israel shipped the crude oil it extracted from the oil corridor in Sinai using tankers, which were operating in its service, to the oil terminal in Eilat, and from there through the Eilat-Ashkelon oil pipeline (nowadays named Europe-Asia Pipeline Co, EAPC) to the Mediterranean. This production by Israel, through a government corporation named *Netivei Neft*, infuriated the Egyptians, who considered Israel to have usurped Egypt's natural resources for its own use. For this reason, the Egyptian leadership decided, among other things, to task the Egyptian Navy with laying naval mines at the Straits of Gubal during the October 1973 war, to prevent tanker traffic in Israel's service from making the trip between the Gulf of Suez and the Gulf of Eilat. The Egyptian mining was done in secret and caught Israel by surprise. On October 26, 1973, just two days after a ceasefire came into effect, the naval minelaying become evident to Israel when a tanker in its service named *Siris* hit two powerful mines and sank.[9] The naval mining action in the Straits of Gubal was a final touch to the naval blockade the Egyptian Navy had imposed in the central and southern Red Sea through the use of destroyers and submarines. This was done in an effort to halt shipping to and from the Port of Eilat, and in particular to prevent crude oil from reaching Israel from the Persian Gulf.

In September 1975, as part of the interim agreement (Sinai II) with Egypt, Israel agreed to vacate the oil installations in Sinai. After the production facilities were returned to the Egyptians, additional oil fields were discovered in western Sinai. However, 50% of Egypt's crude oil continued to be extracted from the Gulf of Suez. Between 1996 and 2005, the crude oil production decreased following depletion of the existing fields and the failure to develop new ones. Concurrent with the decline in crude oil production, new deposits of natural gas were being discovered, initially in the Mediterranean, with the first signs of gas deposits being discovered in the late 1960s. The first was discovered in 1969 in the Abu Qir Bay (close to the Port of Alexandria).[10] Egypt's gas fields in the Mediterranean, most of which were discovered from the 1990s onwards, and in particular during the first two decades of the 21st century, are not within the scope of this article.

The Gulf of Suez continues to be a source for production of crude oil, however in recent years it has also entered the era of natural gas production. The Norwegian

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9 About the surprise naval mining in the Straits of Gubal during the October 1973 war, see: Shlomo Guetta, The Egyptian Sea Mining Surprise during the Yom Kippur War (October War 1973), In Shaul Chorev and Ehud Gonen (eds.), *Maritime Strategic Evaluation for Israel 2020/21*, (Haifa: Maritime Policy and Strategy Research Center, University of Haifa, 2021) pp. 228–242.

10 From the Egyptian Ministry of Petroleum and Mineral Resources website Natural Gas, *Ministry of Petroleum and Mineral Resources.*

company Neptune won an oil exploration tender in 2018 to explore and produce crude oil and gas in the offshore field named Al Amal (block No. 4), located in the southwestern section of the Gulf of Suez, south of Ras Gharib and north of Al-Ghardaqah (see Figure 7).[11]

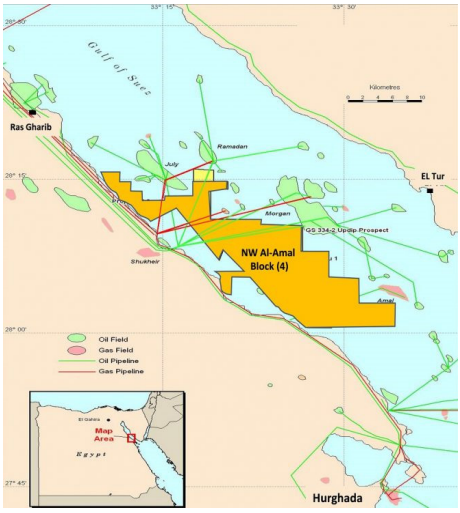


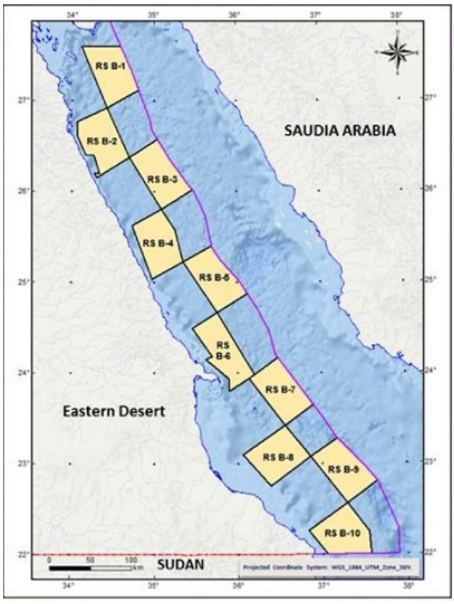
Figure 7: The Neptune concession map for oil and gas exploration in the South Gulf of Suez (North Red Sea).

Figure 8: Area of responsibility of the Egyptian holding company Ganope in the Red Sea (between latitude 22 degrees in the south and latitude 28 degrees in the north)

Egypt – Potential gas fields in the Red Sea

In the previous decade, feasibility checks were conducted for gas exploration in the Red Sea, headed by the Egyptian holding company Ganope. Apparently, following the maritime boundary agreement between Egypt and Saudi Arabia, signed in 2016, in 2017 agreements were signed with the American company Schlumberger and with the British TGC to conduct preliminary seismic surveys in the Red Sea. In March 2019, based on the findings of the seismic surveys, Egypt issued a huge gas exploration tender in 10 sites ("Blocks") within the maritime region spanning from the northern Red Sea as far as the Sudanese border, including the maritime region of the Hala'ib Triangle (see figures 8 and 9). The tender was closed in September 2019.

11 Neptune Energy awarded oil exploration license in Egypt, *World Oil*, 2/12/2019.



Offshore Red Sea International Bid Round /2019 Blocks

No.	Name	Area in km²
1	Red Sea Block 1	3057
2	Red Sea Block 2	3010
3	Red Sea Block 3	3097
4	Red Sea Block 4	3084
5	Red Sea Block 5	3025
6	Red Sea Block 6	3050
7	Red Sea Block 7	3090
8	Red Sea Block 8	3060
9	Red Sea Block 9	3067
10	Red Sea Block 10	3039

Figure 9: The blocks (sites) included in the 2019 Egyptian tender

At the end of December 2019, the names of the companies that had won three of the ten blocks included in the tender were announced. American company Chevron won block 1 (figure 10), Dutch Shell won block 3 (figure 11), and block 4 went to the United Arab Emirates company Mubadala, jointly with Dutch Shell (figure 12). It is worth noting that Shell and Chevron are also involved in gas exploration and production in Egypt's Economic Waters in the Mediterranean. Another noteworthy fact is that Chevron, the American energy giant, which until 2019 operated only in the Persian Gulf region in the Middle East, got involved also in Israel's Economic Waters after buying Noble Energy's assets in the Tamar and Leviatan gas fields.

In July 2020, the Egyptian parliament approved the wins those companies had made in those three north Red Sea blocks.[12] In this context it should be noted that so far, to the best of my knowledge, no activity has been detected indicating discovery or actual production of a single gas deposit from any one of the above blocks. Another unclear fact concerns block 2, the winner of which, if any, remains unknown.

12 Announcement of Egyptian Parliament approval of 12 gas and oil exploration agreements, including in the Red Sea: Egypt's House of Representatives approves 12 Oil & Gas E&P Agreements, *Energy Egypt*, July 7, 2020.

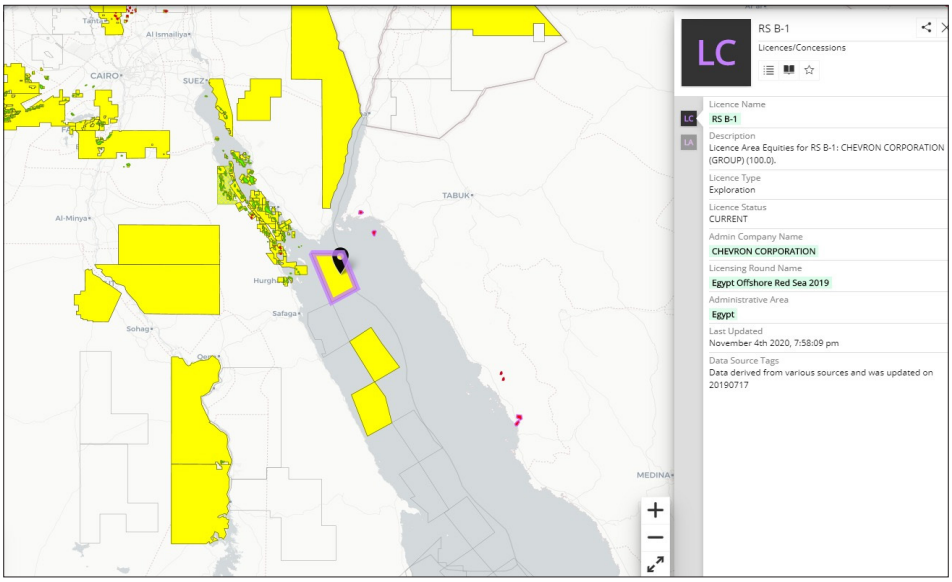


Figure 10: Chevron's win of Block 1

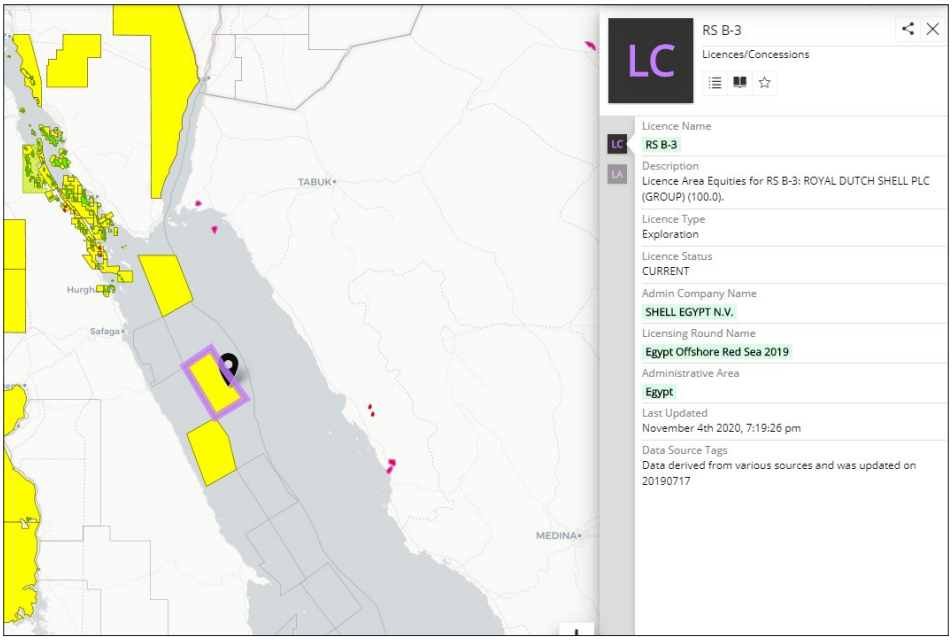


Figure 11: Shell's win of Block 3

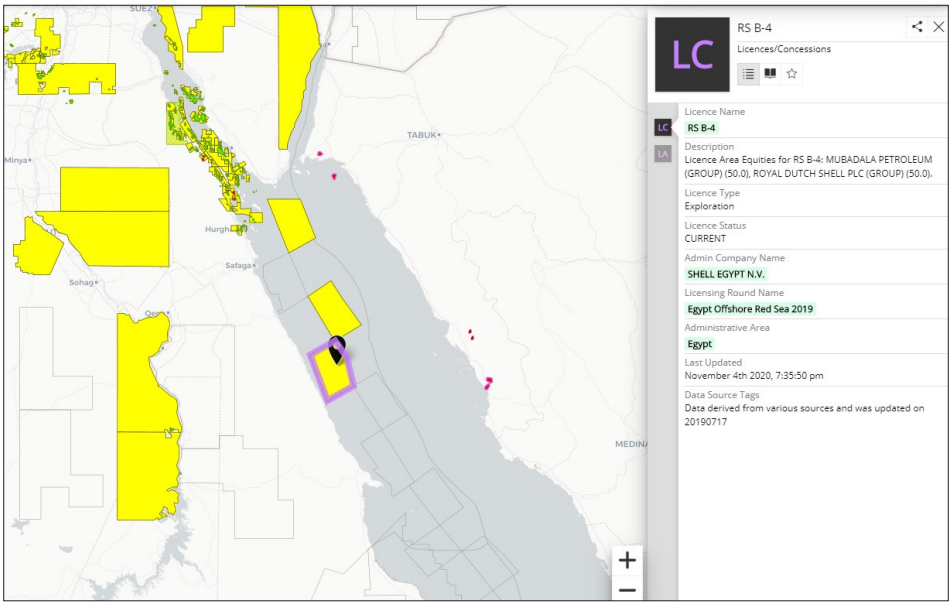


Figure 12: Mubadala's and Shell's win of Block 4

In short, Egypt has been producing crude oil from offshore and onshore production facilities within the Gulf of Suez region, on both its shores, for over 100 years. Norway's Neptune has recently begun producing gas in the southern Gulf of Suez. As for the Red Sea, following the maritime boundaries agreement with Saudi Arabia, seismic surveys were carried out, which likely produced positive results. Following these, Egypt issued a tender and three leading energy companies have in the meantime already had wins in the tender. Exploration activities or actual production have not yet been detected. Apparently, the Red Sea holds good potential, as far as Egypt is concerned, for gas deposit discoveries, which will be added onto the ample deposits which have already been discovered, in the Mediterranean over the past two decades.

Saudi Arabia – Potential and realization of energy in the Red Sea

Most of Saudi Arabia's energy reserves are concentrated in the Persian Gulf and on its shores. In particularly in the al Hasa Oasis. Saudi Arabia is one of the world's largest energy producers. This began in the 1940s through ARAMCO – the Arabian-American Oil Company – but beginning in the 1970s, Saudi Arabia took full control over the oil production within its boundaries. In 1980, Saudi Arabia became the Company's sole stockholder, and the company's name was changed to Saudi ARAMCO.

Following the agreement with Egypt in 2016, Saudi Arabia began searching for gas deposits in the Red Sea through its national energy company ARAMCO. On March 7, 2019, Saudi Ministry of Energy Khalid Al-Falih, announced the discovery of "large quantities of gas" in the Red Sea. Al-Falih noted that ARAMCO would be stepping up its natural gas exploration activities in the Red Sea over the next two years. In his statement, Al-Falih did not specify the estimated quantity of natural gas found, nor did he indicate the location of the newly-discovered deposit. He did however explain that the oil quantities in the Red Sea were low and that the cost of its extraction was prohibitive since the oil reservoirs are located at depths ranging from 1,200 to 1,500 meters below the surface. It should be noted, that before the new reservoir was discovered in the Red Sea, the 2017 data from the US Energy Information Administration showed that Saudi Arabia had natural gas reserves totaling 303 trillion cubic feet. That same year ARAMCO's natural gas production totaled about 12.4 billion cubic feet per day, compared with 12.03 billion in 2016.[13]

Regardless of the size of the new Saudi natural gas deposit in the Red Sea, the very fact of its discovery shows that the Red Sea, too, is a potential region where more gas deposits may be found. It is possible that the discovery in Saudi Arabia motivated the Egyptians to issue the tender for gas exploration that same year in the ten blocks on the western side of the Red Sea.

Oil pipelines in the Red Sea

This area is not directly related to this paper's main them ("Economic Waters"), however to complete the picture, and in order to present another aspect related to the importance of the Red Sea for the world of global energy marketing, it is worth discussing briefly.

Oil pipelines serve for transporting oil from its extraction site to an oil refinery or port from which it continues in tankers to oil refineries and from there to distribution stations. Oil pipelines are of considerable economic and political importance. As an interface to the Red Sea, one can point to three such piping systems:

1. The oil pipeline from the Persian Gulf to Saudi Arabian city of Yanbu on the Red Sea coast. This line was built to bypass the Straits of Hormuz, which are under threat from the Iranians and their proxies, the Houthis. Unrelated to the Red Sea, the Saudis once had the TAPline pipeline, which traversed Jordan and split

13 A report quoting the Saudi news agency SPA: Large gas reserves found off Saudi Arabia's Red Sea coast, *Arabian Business*, 10 Mar. 2019. And also: Saudi Arabia finds 'large quantities of gas' in Red Sea, Energy, 8 Mar. 2019

to Syria and Lebanon. In addition, a pipeline is planned to exit Saudi Arabia via Oman to the Indian Ocean coast also in order to bypass the Straits of Hormuz.

2. The SUMED oil pipeline – a pipeline in Egypt that transports crude oil from the Ain Sukhna terminal on the northern end of the Gulf of Suez to Alexandria on the Mediterranean coast. This pipeline is intended to serve as an alternative to the passage of oil tankers departing from the Persian Gulf through the Suez Canal.
3. The Eilat-Ashkelon Pipeline, which is today named the Europe Asia Pipeline Company (EAPC) – was originally built to transport Iranian oil to the Mediterranean, bypassing the Suez Canal. Following the 'Abraham Accords', recent reports suggest it could serve for transferring crude oil from the United Arab Emirates in tankers to the Port of Eilat, from where it will continue through the pipeline to the Mediterranean. This option has aroused vociferous criticism from environmental protection quarters due to the fear of the risks of crude oil spills in the Gulf of Eilat as well as spills due to damage and malfunctions along the overland pipeline's route from Eilat to Ashkelon.[14]

In short, concerning the extraction of crude oil, the Red Sea is emerging as a region in which natural energy resources are being used. This has been done since the early 20th century, particularly in the Gulf of Suez, and concerning natural gas, this area has also seen an uptick in activity in recent years, following the measures taken in Egypt and Saudi Arabia.

Opportunities and Risk Scenarios

The previous two sections reviewed the picture of the Exclusive Economic Zones (EEZ) belonging to the countries bordering the Red Sea and the arrangements, agreements, understandings or disputes between them as to their maritime borders. As for the actual realization of the energy resource potential in the Red Sea, the review focused mainly on Egypt and Saudi Arabia.

In terms of the potential of the Economic Waters in the Red Sea, as well as from the aspect of actual realization, it is clear that the Red Sea will develop into another center of energy in the Middle East in the coming years. Although this will not be at the magnitude we have become accustomed to in the Eastern Mediterranean and Persian Gulf, it is still a focus that should be taken seriously in future. On the one hand, the region holds promise to increase the revenues of the stakeholder

14 On this issue, see Shaul Chorev and Moshe Terdiman, Extending the EAPC activity – and the lessons of the Guardian of the Walls Operation, Maritime Policy & Strategy Research Center, University of Haifa, June 2021 [Hebrew].

countries, however on the other hand, it might also provoke disputes and conflicts on top of those which have already existed there in the past decade. These include the tension between Egypt and Ethiopia over the Renaissance Dam, the political instability in countries like Sudan and Ethiopia, the protracted civil war in Yemen and the Iranian involvement in that war, which highlights the risks to freedom of navigation in the critical choke point at the south of the Red Sea – the Straits of Bab el-Mandeb. And last but not least are the threats of terrorism and piracy in the Gulf of Aden region on the way to the Red Sea.

The level of these risks and threats in the southern Red Sea has lately been on the agenda of the command of the American Fifth Fleet. In view of this, the US Navy (Fifth Fleet) Central Command decided to send two minesweepers into the southern Red Sea – the *USS Gladiator* (MCM 11) and the *USS Sentry* (MCM 3), which crossed the Straits of Bab el-Mandeb on October 18, 2021. These vessels are intended to purge and neutralize naval mines which get randomly laid by the Houthis near the Straits of Bab el-Mandeb and near Saudi ports and islands in the Red Sea.

Figure 13: The US Naby minesweeper that entered the Red Sea in October 2021

Regarding the clearly visible risks and opportunities concerning the Red Sea, it is worth quoting Dr. Moshe Terdiman, an expert on the Red Sea Basin and the environment in the Arab Muslim world:

> Undoubtedly, the Red Sea Basin is becoming extremely active in terms of energy. Until now, the Red Sea has functioned as a main transit route for energy shipments. However, from now on, the Red Sea is in itself a source for energy production. This change is expected to radically alter the definition of the Red Sea Basin and its importance. It may be holding the seeds of a great promise and prosperity for all of the countries in the Basin, but at the same time it might also be a source of disputes and power struggles, especially when considering the battle raging between the

> superpowers and the regional powers over hegemony in the region. Time will tell how this unfolds. However, because of this, Israel, which is also located in the Red Sea Basin, should be mindful of events in this highly-dynamic region.[15]

Dr. Terdiman's analysis from early 2019 remains valid and relevant today too, in particular in view of the sensitivity that has emerged in the past two years around the Red Sea, which involves Israel. As mentioned earlier, Saudi Arabia and Egypt are currently the lead players concerning the Economic Waters in the Red Sea and their exploitation, and therefore we shall devote a few final words to the challenges and threat profiles, and to these two countries' response to them.

Saudi Arabia

Most of the Kingdom's energy assets are concentrated in the eastern parts of the Arabian Peninsula bordering the Persian Gulf. However, in recent years, Saudi Arabia has come to regard the Red Sea as being highly important and is even establishing one of its most prestigious projects there – Neom, a futuristic city in the southern part of the Gulf of Aqaba, which will serve as a bridgehead to Egypt's Sharm el-Sheikh. The project was announced in 2017 as a central feature of the Saudi Vision 2030 Plan.

The Saudi naval force buildup is also in full momentum, part of which is being directed at the Red Sea Region. Saudi Arabia has three main ports in this region – Jeddah, Yanbu and Jizan. The Port of Jeddah is Saudi Arabia's main Red Sea port, named after the Late King Faisal. The Port's naval dock serves the Saudi "Western Fleet".[16]

The main Saudi Navy vessels currently deployed in the Red Sea are four French-made missile frigates (*Al-Madinah* class), built in the 1980s and also two missile boats and a minesweeper. The rest of the surface combat vessels (frigates and missile corvettes), which were built in the United States and France are deployed in the Persian Gulf.

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15 See Moshe Terdiman's article, The World in Turmoil / A Sea of Energy. *Davar*, March 22 2019 [Hebrew]. Further elaboration about the Red Sea can be found in the two following articles: Moshe Terdiman, The Boiling Water of the Red Sea: Power Struggles and Israel's Iterests. *Mitvim, The Israeli Institute of Regional Foreign Policy*, September 2018; Moshe Terdiman, Israel and the Red Sea Basin: Challenges and Opportunities. *Mitvim*, December 2020 [Hebrew].

16 The Saudi Navy is split between two arenas. The "Eastern Fleet" in the Persian Gulf, whose home port is Jubail, named after the Late King Abdulaziz, and the "Western Fleet", based in Jeddah. The Naval headquarters are located in the capital Riyadh. For general information on the Saudi Navy, go to the Wikipedia entry: Royal Saudi Navy

Presently, the Saudi Navy is in the midst of an ambitious procurement drive, apparently as part of the Vision 2030. The total worth of this drive is approximately $4 billion. It can be assumed that some of the vessels included in this program will be posted to the Red Sea arena:

- Four multipurpose missile frigates of the *Freedom* class are currently under construction in the Fincantieri Marinette Marine shipyards in the United States. Delivery is scheduled to begin in 2023. This deal is worth approximately $2 billion.[17]
- Five missile corvettes model *AVANTE-2000*, which are currently under construction at the Navantia shipyard in Spain. So far, three corvettes, which are included in this project, named Sarawat, have been launched, costing approximately $2.1 billion.[18]

Figure 14: Vessels under construction in the United States and Spain

Saudi Arabia has in the past decade been embroiled in the ongoing civil war in Yemen. It supports the central government headed by Yemeni President Abdrabbuh Mansur Hadi. Saudi Arabia's bitter enemies in this war are the Houthis, who are supported, trained and armed by Iran. Iran also provides the knowledge needed for self-production of various armaments. Since the Houthis control the Red Sea region of Yemen, this war has also assumed considerable naval dimensions. The Houthi

17 About the construction of the frigates in the United States, see: David B. Larter, Lockheed inks $1.96B contract for Saudi frigate, *Defense News*, December 20, 2019.

18 Sarawat, the name given to the corvette construction project in Spain, is a mountain range in western Saudi Arabia, bordering the Red Sea. Does the project name hint to the boats' being deployed in the Red Sea? Possibly. For more on the construction of the corvettes in Spain, see: Avante 2200 Combatant corvette is designed and built by Spanish shipbuilder Navantia, *Naval Technology*, September 18, 2020; Royal Saudi Navy launches new ship in Spain, *Arab News*, April 1, 2021.

rebels have laid naval mines along the coast in Yemeni waters and also opposite the Saudi coast. They have used explosive boat and launched land-to-sea missiles primarily against Saudi naval vessels. At least one case is known (in April 2018) in which they hit a Saudi oil tanker.

Egypt[19]

Egypt's main energy assets are currently located in the Eastern Mediterranean – particularly prolific gas deposits discovered over the past decade. However, the Red Sea is of no less strategic importance because of the two choke points – the Suez Canal and the Straits of Bab el-Mandeb – that are very important to Egypt's economy. Freedom of navigation in these points have implications on Egyptian revenues.[20]

As for the threat of naval mine laying mentioned earlier, it is worth noting that in 1984 Egypt itself fell victim to naval mines laid by Libya in the Gulf of Suez, apparently at the behest of Iran, in order to disrupt the transfer of weapons destined for Iraq from Egypt's Port of Suez to the ports of Aqaba in Jordan and Yanbu in Saudi Arabia. This mining activity demonstrated to Egypt and to the other users of the Suez Canal the risks involved in such hostile action.

The importance of these choke points to Egypt is further increased due to the potential gas deposits in the Red Sea region, being a continuation of the energy deposits already in use in the Gulf of Suez.

In addition, there are serious tensions building up between Egypt and Ethiopia due to the construction and operation of the Renaissance Dam in Ethiopia. Egypt considers it an existential imperative that the proper flow of water in the Nile River is not disrupted due to this dam, and that the flow rate needed by a populous country like Egypt (over 100 million inhabitants) must not be diminished. Sudan shares this concern with Egypt. Although Ethiopia does not have an outlet to the sea following the separation from Eritrea, the maritime medium in the Red Sea and Gulf of Aden allows Egypt to come dangerously close to Ethiopia. This might

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19 On the challenges facing the Egyptian Navy and on its significant force buildup in recent years, see Shlomo Guetta, "The Egyptian Navy - Its Origins and Its Future (Is It on Its Way to Becoming a "Green Water" Navy?" in Shaul Chorev and Ehud Gonen (eds.*), Strategic Maritime Evaluation for Israel 2019/20* (Haifa: Maritime Policy and Strategy Research Center, University of Haifa, 2020) pp. 1–22; Shlomo Guetta, The Egyptian Navy: Renewal in the Face of Combined Challenges, *Israel Defense*, May 24, 2020 [Hebrew].

20 The incident in March 2021, when the Suez Canal got blocked for a week by the giant *Ever Given* container ship, demonstrated this dependency and the economic damage caused by the blocking of shipping traffic in the Canal was estimated at $9.6 billion per day.

explain the cooperation agreement Egypt signed recently with Djibouti, including the construction of a logistic base on its territory.[21]

Another challenge breathing down Egypt's neck in the Red Sea is the possibility of Turkish penetration and presence in the Red Sea. Turkey nowadays is an adversary of Egypt, ever since 2013, when President Abdel Fattah a-Sisi deposed the then-President of Egypt, Mohamed Morsi, who was a member of the Muslim Brotherhood. Ever since the attempted coup in 2016, Turkey has been actively implementing a Neo-Ottoman policy in the Red Sea region and in the Horn of Africa. In 2018, Ankara signed an agreement with Khartoum, allowing it to maintain a military presence in Sudan and in its territorial waters, including a base on the Island of Suakin, and it is also negotiating with Djibouti on the construction of another base. Qatar also signed an agreement with Sudan in 2018 regarding a port in Suakin. The Red Sea, then, is an arena in which various countries like Turkey and Qatar are increasing their involvement.[22] It is unclear where the relations between Turkey and Sudan stand today following the improvement in relations between Egypt and Sudan due to their shared interests over the Renaissance Dam. Further uncertainty has been added in late October 2021 in view of the political turbulence in Sudan. It is likely that Turkey will continue to seek renewed dialog with Sudan as part of its strategy of restoring the Ottoman "glory" of yesteryear.

From the Egyptian perspective, the Red Sea region, including the Gulf of Aden, poses challenges and threat profiles which the Egyptians are compelled to address. The current characteristics of the Red Sea arena, as well as the challenges Egypt is facing in this arena, have resulted in a strategic decision to reorganize the Egyptian naval space and to divide it into two arenas and, accordingly, into two fleets: the "Southern Fleet" in the Red Sea and the "Northern Fleet" in the Mediterranean. This division has been made in order to improve and streamline the naval force building and its operation. To enable each "Fleet" freedom of operation and control in their respective arenas, in an effort to reduce to a minimum the interdependency between the two arenas as had been the case in the past – for example when the Suez Canal was blocked between the June 1967 war and the October 1973 war.

The organizational division included considerable contents and resources. First of all, new, advanced surface, submarine and aircraft platforms have been procured and

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21 For a report on Egyptian President A-Sisi in Djibouti in May 2021, see: Egyptian, Djiboutian presidents hold talks over ongoing water dispute with Ethiopia, *Arab News*, May 28, 2021.

22 Yoel Gozhanski and Oded Eran, The Red Sea: An Old-New Area of Interest. *Top View*, Issue 1067, June 12, 2018, INSS The Institute of National Security Studies [Hebrew].

inducted into service for maritime missions, part of which have been carried out in the Red Sea arena, including one of two helicopter carriers built in France (Figure 15). Second, a modern new naval port has been built in Ras-Banas (one of several new ports and naval bases recently built in Egypt, mostly in the Mediterranean) (Figure 16). The new naval port in Ras-Banas (with an area of approximately 600 sq. km) is located 90 km from the border with Sudan. It constitutes a significant addition to the Egyptian Navy, whose main Red Sea base, so far, had been in the more northerly Port of Safaga. The port was built with support from the UAE and was inaugurated in January 2020 by President a-Sisi in the presence of Emirati Crown Prince Mohammed Bin Zayed.[23]

Figure 15: Egyptian helicopter carrier

Figure 16: The new port in Ras-Banas

Assuming the relations between Saudi Arabia and Egypt will continue on a cordial note as they are today, one can assume that the Egyptian military might in general, and its naval strength in the Red Sea in particular, will also serve the Saudis, who have important ports and assets along the Red Sea coast. In addition to the friendly relations between the two countries, it should be noted that the Saudis, as well as the United Arab Emirates, contribute much toward the Egyptian economy, including toward its military procurement. Therefore, insofar as Saudi Arabia might need protection of its Economic Waters and its other assets in the Red Sea, it will be able to rely on support from Egypt.

In addition to the Saudi and Egyptian naval force buildup and their implications to the Red Sea arena, the establishment of the Arab Naval Coalition is noteworthy. It is headed by Saudi Arabia, and is intended to prevent Iran from continuing with its weapon shipments to the Houthis, and also to deal with the naval threats posed by the Iranians and the Houthis in the southern Red Sea, with special emphasis on the Straits of Bab el-Mandeb. This naval coalition conducts joint naval exercises with

23 Yoel Gozhanski, The Red Sea: Embroiled in Conflicting Rivalries. *IDF Website*, September 2020 [Hebrew]; Jeremy Binnie, Egypt inaugurates major Red Sea base complex, *Janes* 16, January 2020.

the regional navies. For example, the Morgan 16 exercise, conducted jointly by the Egyptian and Saudi navies in the Red Sea in January 2020, was intended to practice coping with current and future threats.[24]

Regarding naval activity in the Red Sea, it should be noted that since 2016, an Iranian special operations ship (espionage/logistics) named *Saviz* had operated opposite the coast of Yemen/Eritrea. This ship belongs to, and apparently was operated by, the Iranian Navy, however due to the support provided through this ship to the Houthis in their war with Saudi Arabia, it is likely that the Revolutionary Guards Naval Force was also involved, or at least coordinated with its operation. In early April 2021 this ship was hit, according to various sources by Israel. In July 2021 an identical "sister" ship, the *Behsad*, took up its position in the region.

Figure 17: The Iranian Saviz spy ship and its location in the Red Sea

Another noteworthy framework is the "Council of Arab and African States Bordering the Red Sea and the Gulf of Aden", which can be relevant concerning the economic assets. It was established as a Saudi initiative in a summit meeting in Riyadh in December 2018 attended by Saudi King Salman Bin Abdelaziz and the Foreign Ministers of Saudi Arabia, Egypt, Yemen, Somalia, Jordan and Djibouti. At the end of the summit, Saudi Foreign Minister Adel al-Jubeir stated that "This is part of an overall effort on the part of the Kingdom to safeguard its interests and those of its neighbors", and promised to expand the economic cooperation between the countries. Since most of them are anyway clients of the Saudi Arabian coffers, the

24 Egypt, Saudi Arabia conduct 'Morgan-16' naval exercise. *Egypt Today*, January 22, 2020.

"Union" will be underwritten by the Kingdom in full.[25] Regarding the establishment of the military and economic alliances with the Red Sea states that Saudi Arabia initiated, it is worth reading Dr. Terdiman's updated review: Israel and the Red Sea Basin: Challenges and Opportunities.[26]

To sum up the regional and global interest in the Red Sea, one can say that the Red Sea is gaining more and more importance in global geopolitics. Considering its importance for global trade and security, increasing geo-economic forecasts, military rivalries and the danger of conflict between central regional and international players. The regional countries as well as the superpowers are making efforts to increase their influence in the Red Sea and Horn of Africa, which analysts Luigi Narbone and Cyril Widdershoven believe might create a new potential conflict. One of the examples of such a conflict is the war in Yemen. They believe the security of the Straits of Bab el-Mandeb is related to resolving the war in Yemen.[27]

And what about Israel?

Concerning Economic Waters and Exclusive Economic Zones, Israel is not a player in the Red Sea when compared to the assets it has in the Mediterranean. This being said, Israel does have clear interests in whatever happens and is being done in the Red Sea. It is clear that the same challenges and threat profiles which occupy the agendas of the Saudi Arabia, the United Arab Emirates and Egypt should also be of interest to Israel, such as the interest in preserving freedom of navigation in the Straits of Bab el-Mandeb and in the Suez Canal. The shipping lanes to and from Israel via the Red Sea and Suez Canal are significant. So is the potential threat on the part of the Houthis and the Iranians in the southern Red Sea – this is a challenge that must be monitored carefully.

The Red Sea-related military and economic alliances which have been set up under Saudi initiatives in recent years, which also radiate toward East Africa, could serve as a platform for regional cooperation as a complement to the Abraham Accords and the peace treaty with Egypt. Israel should seek recognition of its status in the Red Sea just as it has been recognized as a member of the Mediterranean Gas Forum.

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25 Shaul Yanai, The Red Sea Alliance, *Ynet*, January 24, 2019 [Hebrew].

26 Moshe Terdiman, Israel and the Red Sea Basin: Challenges and Opportunities. *Mitvim*, December 2020, pp. 4–5 [Hebrew].

27 Luigi Narbone and Cyril Widdershoven, The Red Sea link: Geo-economic projections, shifting alliances, and the threats to maritime trade flows. *Robert Schuman Center*, European University Institute, July 2021.

This is also the opinion of analysts from the Robert Schuman Center, according to whom a framework of regional security and integration, and inclusion in the "Red Sea Alliance", may from Israel's perspective be influenced by the Abraham Accords.[28]

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28 Ibid, p. 17.

Solar Hopes and Grounded Reality: Should and Could Israel Meet its 2030 Renewable Energy Transition Targets

Elai Rettig

Despite the sweeping political consensus in Israel to promote more use of renewable energy sources, Israel's electricity market is only expected to increase its reliance on natural gas in the coming decade. Numerous geographic and technological barriers make the target that the Israeli government has set for itself to generate 30% of Israel's electricity from renewable sources by 2030 a particularly challenging one to meet. Since Israel has a very marginal effect on the overall global balance of manmade carbon emissions (less than 0.23%), it should concentrate most of its efforts on reducing local air pollution and increasing its readiness towards climate-induced threats, with carbon reduction treated mostly as a welcomed side-effect. Israel can achieve some of these goals relatively quickly by reducing the use of its coal-based power stations and encouraging more use of public transportation and electric and hybrid vehicles. Serving as a domestic and relatively cheap source of fuel, natural gas will be an integral part of these solutions for the time being, and the demand for it is only expected to increase in Israel and in all of the countries of the Eastern Mediterranean basin in the next two decades.

In May 2021, the inter-ministerial committee on Israel's natural gas policy recommended increasing the export quota of natural gas from Israel to 52% (up from the current 40%) at the expense of the amount earmarked to the domestic market.[1] The committee argued that in another 20 years the demand for natural gas in Israel and worldwide will substantially decrease due to an expected transition into renewable energy sources. Therefore, Israel should export as much gas as it can today so that it will not be left unused in the ground tomorrow. The committee argued that such a scenario would result in considerable loss of revenue and export royalties for the State of Israel.[2]

The committee's decision seemingly makes sense. The same month that the recommendation was made, the Ministry of Energy also presented for public response Government Decision 465 of October 2020, which set a target to generate

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1 Ministry of Energy, "Recommendations for policy measures for promotion of renewable energy - summary of interministerial administrative work following government decision 564", May 2021 [Hebrew].

2 Israel Fischer, "Change in the Gas Outline: The companies will be able to increase exports", *The Marker*, May 31, 2021 [Hebrew].

30% of Israel's electricity from renewable sources by 2030, in line with similar targets set by the European Union in 2018.[3] Assuming the Israeli energy market will indeed meet these targets and even exceed them in the subsequent decade, there is a legitimate concern that demand for natural gas will fall and that the energy companies operating in Israel would be left with stranded assets in the ground. Moreover, the current gas export allocation of 40% is not proving to be sufficiently attractive to investors wishing to build a gas liquefaction plant or an underwater pipeline to Europe, at an estimated cost of approximately $7 billion. This is due partly to the fact that the amount allocated to them is relatively small, around 300 billion cubic meters (BCM) over 30 years. Without increasing the quota, the gas companies operating in Israel fear they will not be able to attract additional buyers for approximately two thirds of the gas they still have left for export (after deducting the trade deals with Jordan and Egypt). This gap is especially important ahead of the Ministry of Energy's new licensing round designed to attract more companies to search for oil and gas deposits in Israel's exclusive economic zone (EEZ), after the previous three rounds failed to arouse sufficient interest. So long as the current companies operating in Israel cannot prove there are buyers for the gas they had already discovered, there is no incentive for new companies to search for more of it.

Besides the ability to release more natural gas for export and make the Israeli energy market more attractive to investors, the promotion of renewable energy also holds numerous advantages for Israel's economy and security and is therefore supported by the entire political spectrum in Israel. Renewable energy in Israel can help (1) increase its energy independence, (2) decentralize and disperse its sources of electricity generation,, thereby increasing the resilience of its grid to rocket attacks launched by militant groups during war, (3) encourage technological innovation in an emerging new field with the help of Israel's vibrant "start-up" sector, which can then be translated into more jobs and products to sell to global markets, (4) supply electricity to remote mountainous areas in the north of Israel and desert areas in the south without having to invest in costly long-distance infrastructure and maintenance, (5) reduce Palestinian dependence on Israeli electricity supply which, quite often, goes unpaid, and (6) reduce Israel's total carbon emissions, compared with the burning of natural gas or coal.

Despite the keen interest in renewable energy in Israel, for the time being there is no realistic scenario in which the Ministry of Energy will meet its targets for 2030 or in which Israel and the countries around it will decrease their use of natural

[3] Ministry of Energy, "Report of the professional panel for the second periodic examination of the government policy on the natural gas market – draft for public comments", May 2021 [Hebrew].

gas. Already today Israel is failing in its efforts to meet the targets it set for itself. Whereas the original target was that 10% of its electricity mix would be generated from renewable energy by 2020, Israel as of 2021 stands at a mere 6.1%.[4] The reason for this is not political, but rather primarily technological. Israel's geographical constraints whittle down the term "renewable energy" to just solar energy, whereas the European renewable target consists primarily of wind energy, hydroelectric, and wood burning.[5] The current generation of photo-voltaic panels (PV) is not particularly efficient relative to the space it occupies, and Israel is facing a steep challenge locating sufficient land area for the number of solar panels it needs to achieve its 30% electricity target by 2030. For calculation purposes, on a particularly hot day in July 2020, Israel reached peak consumption of 13,800 Mega Watts per hour (MW/h).[6] The annual growth in demand for electricity in Israel during this past decade stands at approximately 2.8% on average, and this number may grow to 3.5% per year if electric vehicles and additional water desalination plants enter the market as expected.[7] Even if we take a more modest 3% growth scenario, the demand for energy on a hot summer day in July 2030 will stand at approximately 17,900 MW/h. To cover 30% of this demand Israel will have to generate approximately 5,370 MW from solar energy at any given moment. According to the calculations of the United States Government National Renewable Energy Laboratory (NREL), the continuous generation of such an amount of electricity with the current technologies of PV panels will require an area of between 70-120 sq. km, depending on weather conditions.[8] In comparison, the entire land area of Tel Aviv is 52 sq. km, which means solar panels will have to cover a combined area of at least 1.5 times the city of Tel-Aviv. These calculations assume no growth from 2030 onwards, but in reality, Israel is going to have to provide an extra 7 to 12 sq. km per year to build new solar plants just to keep up with the annual growth and remain within the 30% range – a new Tel-Aviv every 6 years on average.

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4 Ministry of Environmental Protection, "Reducing Greenhouse gas emissions in Israel – annual follow-up report", May 2021 [Hebrew].

5 European Commission, "Directive (EU) 2018/2001 of the European Parliament and of the Council on the Promotion of the Use of Energy from Renewable Sources", December 11, 2018.

6 The Electricity Authority, "Report on the State of the Electricity Market 2020". August 2020 [Hebrew].

7 Roeh, Anat. "Private electricity producers: updating the Israel Electric Corporation's demand forecast, a substantial increase is expected", *Calcalist*, 29 June, 2021 [Hebrew].

8 National Renewable Energy Laboratories, "Land Use by System Technology", Accessed on October 30, 2021.

These constraints only take into consideration the challenge of electricity generation, but the transmission stage can prove even more challenging. Solar energy does not generate electricity on demand, nor does it stop generating electricity when not needed. This requires exceedingly sophisticated and complicated electricity grid management technology to handle. On the one hand, during nighttime or cloudy days there is a shortfall of solar electricity generation just as demand for electricity peaks (between 6pm-10pm), and this needs to be compensated by ramping up the natural gas-powered power stations. On the other hand, when the sun is shining bright in midday and the PV panels are generating at full capacity, some of the gas-powered stations need to decrease generation or completely shut down so as not to lead to its collapse. This requires compensating or subsidizing privately-owned gas power stations, since they would be asked to lose revenue to make way for their competitors. In addition, the more decentralized the electricity grid becomes, and the more private consumers begin feeding electricity into the grid through their own rooftop PV panels in tens of thousands of locations, the "smarter" the grid has to be to balance between supply and demand, all of which are at the mercy of weather patterns that are becoming increasingly hard to predict as the effects of climate change become more prominent. This will necessitate the creation of microgrids and a redesign of the electricity grid in Israel. Electricity storage technologies (e.g. large-scale batteries) can help overcome many of these challenges, but still have a long way to go in terms of price and efficiency. It appears that the only way the Ministry of Energy will be able to come close to achieving its 2030 targets at a reasonable cost is to import "clean" electricity from outside. One possibility is to rely on Jordan's willingness to build large-scale solar farms in its territory and export electricity to Israel in return for desalinated water, despite domestic public resistance to such a deal. The second possibility is to connect underwater electricity lines from Europe through Cyprus, which will provide a partial solution.

Adding to these complications, recent events from around the world are beginning to deter policymakers from taking the necessary risks that often come with the initial transition to renewable energy. Weather events that resulted in widespread power outages in the US, particularly in Texas during the winter of 2021 and in California during the summers of 2020 and 2021, as well as the gas shortages and price hikes in Europe during the second half of 2021, serve as an indication that the transition to renewable energy will be slower and more complicated than what most people are hoping for. The reliance on wind and solar energy is usually an excellent solution throughout the year, but it fails during extreme weather events, which are increasing in frequency due to climate change. Policymakers thus find themselves in a paradoxical situation where the more extreme the weather becomes, the less

enthusiastic they are to invest in renewable energy solutions that are intended to minimize these same events. This is a sign that natural gas will continue to be a dominant factor in the electricity mix of the State of Israel and of the countries around it for several decades to come, as it provides the reliability that policymakers wish to see. The keenness to reach 30% renewable energy by 2030 might wane in Israel (and in the rest of the world) as widespread blackouts continue to plague industrialized countries in the coming years.

To dispel any doubt, all of these challenges can be overcome through technological innovation and the cumulative experience of energy markets around the world, but such solutions will come at a higher cost for some countries and will take longer to implement for others, including Israel. This is all in contrast to natural gas, which is cheap and readily available to the Israeli market for the next 35 years at minimum, and which is already supplying it with reliable electricity on demand. Even if Israel succeeds in meeting its targets and will generate 30% of its electricity from solar energy by 2030, the high annual growth in demand for electricity means that the Israeli market will still be consuming more natural gas in 2030 than it is consuming today. Adding to this is the fact that natural gas serves not only for electricity generation in Israel, but also heavy industries, petrochemicals, agriculture, and even some transportation, for which solar energy does not offer a solution. Other countries in Israel's region face similar conditions, as their population growth rates and demand for reliable electricity will only increase in the coming decade. Countries such as Egypt, Jordan, Lebanon, Syria and even the Palestinian Authority are expected to increase their demand for natural gas and construct additional gas-powered stations in parallel to their plans of PV power stations. Therefore, a scenario in which Israel will not need as much natural gas in twenty years as it consumes now simply does not add up with the reality on the ground.

A rather challenging question therefore presents itself: why did Israel set such ambitious targets for itself to advance so much renewable energy by 2030, and can it meet its overarching goals by other means? If Israel's main goal is to lower its own carbon emissions as part of its nationally determined contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC), then it is going to be hard-pressed to justify the costs associated with this transition for such a small payout. As of 2020, Israel's contribution to global manmade carbon emissions is 78 million tons per year out of a total of 33,622 million tons, which amounts to about 0.23% of overall emissions.[9] Even if Israel succeeds in drastically reducing its carbon

9 Ministry of Environmental Protection, "Reducing Greenhouse gas emissions in Israel".

emissions through unprecedented investment in infrastructure and changes in its population's lifestyle, the effect this will have on the global fight against climate change is practically nil. Israel should therefore shift its focus to public health and public safety concerns by reducing local air pollution (which would also reduce carbon emissions) and preparing the economy and infrastructure for the anticipated threats and consequences of climate change. These measures can save lives in Israel and in the surrounding countries much more effectively than those that are focused solely on reducing emissions as the overarching goal of which the rest of the targets are derived.

There is a wide range of practical measures Israel can take in the coming years to cope with the expected challenges posed by climate change, and natural gas is a solution for some of them. In terms of air pollution, shutting down coal-powered stations by 2025 will in itself reduce 17 tons of carbon emissions per year,[10] but more importantly, it will clear the air and reduce death rates in densely populated urban areas situated around the coal stations. This is the right thing to do also for Lebanon, the Gaza Strip, and the West Bank, which burn Diesel fuel to generate electricity, and whose subsequent air and ground pollution does not stop at the border. Only gas-powered stations are able to compensate for the shortage of regular, reliable electricity on demand the way that coal-fired stations do for Israel, particularly if the target date for their closure is 2025 as determined by the Ministry of Energy. Another goal Israel should continue to focus on is advancing more efficient, comfortable, and reliable public transportation and promoting the entry of electric and hybrid vehicles into Israel. The Ministry of Environmental Protection expects that such measures will only yield a modest reduction of another 4 million tons of carbon emissions per year by 2030,[11] however much more importantly, they will drastically reduce the "nose-level" air pollution to which the Israeli public is subject to on a daily basis from gasoline vehicles. Here too, compressed natural gas (CNG) can provide part of the solution for weaning Israel's transportation sector (and particularly the Israeli military) away from more polluting gasoline.

Finally, there is a great deal of uncertainty regarding the effects of climate change on the Israeli economy and its citizens' security. Quite naturally, climate change introduces a great deal of unpredictability into any existing threat forecast, and is rife with changes. These threats may include a modest or drastic sea level rise, an increase in the number and intensity of winter storms which may flood major cities,

10 ibid.

11 ibid.

increase the number of electricity blackouts, and devastate the promenades along Israel's shores, extreme heat waves which may impede on pedestrians and damage road infrastructure, prolonged droughts which may destabilize neighboring countries and induce waves of migration towards Israel's borders, and many other scenarios. Having said that, it is very difficult for decision-makers to commit to specific targets and set aside significant resources for a scenario for which there is no clear estimate and whose cost is yet unknown. Therefore, at this stage Israel should closely monitor climate-related events and prepare appropriate response scenarios, which include introducing a high degree of redundancy to the electricity grid so that unexpected supply cuts can be quickly restored even under extreme events, as a lesson from the recent power outages in the United States and Europe. Natural gas is a critical component in creating this redundancy.

Past experience has proven that in all matters concerning long-term forecasts in the energy sector, it is best to take a cautious, conservative approach. Just as the forecasts regarding the amount of royalties that Israel expected to receive from its gas exports mostly failed to materialize, in this case it is worth remaining with the previous gas export quotas that were set at 40%, at least until the high hopes for solar energy in Israel come true, or until more substantial gas fields will be discovered in Israel's EEZ. If the Israeli government sets unrealistic targets for renewable energy integration merely as an excuse to enable more gas exports, it might find itself without sufficient quantities of domestic gas in another twenty years, and will be forced to resort once again to relying on expensive imports.

The Chevron Corporation and the State of Israel

Glen Segell

Since October 2020 there has been a new actor in Israel's strategic maritime space and economy, predominately the energy sector. This is the result of the Chevron Corporation acquiring Noble Energy Inc.—hereafter Chevron and Noble—both US companies. Is Chevron here to stay?

Israel has been a hot potato as far as the global energy industry was concerned. Major energy companies have had too many interests in the Arab world to risk association with Israel. The discovery of natural gas in Israeli territorial waters is not large. But the strategic dynamics have changed since September 2020 with the signing of the Abraham Accords. The Gulf countries have warmed to Israel and so too have energy companies.

At the time of writing, October 2021, it is clear that in the maritime strategic evaluation of the first year of Chevron in Israel, it has not been easy for anyone. There was a rocky start to the new relationship, making it appropriate to examine and review the relationship between Chevron and the State of Israel.

The Financial Aspects

On 5 October 2020, Chevron announced that it completed its acquisition of Noble. At the time, it held a 39.66 percent stake in Israel's Leviathan offshore gas field and a 25 percent stake in the smaller, older Tamar field. Chevron is the sixty-first largest public company in the world. Chevron announced its intention to honor the terms of all existing agreements and contractual obligations that the State of Israel and others had had with Noble (Noble Energy, 2021).

Israel's then Minister of Energy Dr. Yuval Steinitz responded that he welcomed the entry of Chevron into the Israeli market. In accordance with Israeli law, the rights to gas fields cannot be transferred without approval of the State of Israel as the regulator. After an appraisal, the Petroleum Council recommended that the Ministry of Energy Petroleum Commissioner approve the take-over with Noble continuing to operate as a Chevron subsidiary (Ministry of Energy, 2021).

Regional Politics

The financial significance may be overshadowed by the political role Chevron could play because it has operations and economic clout in other countries, for example in

Cyprus, Israel's maritime neighbor in the Mediterranean Sea. Israel's Mediterranean Basin gas fields lie below the Mediterranean Sea between Israel and Cyprus leading to shared and joint interests. Now Chevron holds an interest in safety, security, environmental protection, and in the export of gas to third parties, possibly by a pipeline. Chevron holds a 35 percent stake in the Cypriot Aphrodite gas field with a license until 2044 (Chevron, 2021).

Egypt, the country with the highest population in the Middle East and a peace treaty with Israel, is no less important. In Egypt, Chevron has a 90 percent stake in four oil and gas exploration blocks in the Red Sea and in the Mediterranean Sea (Chevron, 2021). So here too are joint interests in safety, security, environmental protection, and the export of gas to third parties, possibly by a pipeline.

Moreover, Israel will no doubt wish that Chevron would use its connections and clout in Arab states to influence Lebanon to speed up efforts to resolve the issues between Israel and Lebanon regarding the demarcation of the maritime boundary and economic waters between them. Chevron might well do so for a win-win outcome and development of any gas fields that could emerge in Lebanese waters adjacent to both Israel and Cyprus.

Perhaps there might be quicker and more successful progress with Jordan, with whom Israel also has a peace treaty. There have been internal pressures in Jordan by those who oppose normalization with Israel and Noble's deal with the Jordanian electricity company, whereby Jordan would be provided with gas from the Israeli fields. Perhaps there will be less likelihood that Jordan will cede to these pressures considering Chevron's powerful economic clout globally, including in the Arab world (Ersan, 2020).

The Eastern Mediterranean Natural Gas Pipeline

The most significant strategic endeavor that will require the closest partnership between Chevron and Israel is the transportation of gas to external markets. It is fair to assume that Israel will wish that Chevron assists in negotiations with neighboring countries, for example for a gas pipeline to Europe—the proposed Eastern Mediterranean gas pipeline (EastMed). This would be in the financial interests of all.

It is also fair to assume that Chevron's activities are for financial gain and so the company might not wish to be involved directly in any regional politics. But it will need to make a choice. Support EastMed and maybe become embroiled in the emergence of an anti-Turkey bloc of countries. Turkey views the proposed EastMed

pipeline as a threat to its territorial claims in the Mediterranean Sea and believes that the pipeline, which bypasses Turkey to connect Israel with Greece through Cyprus and Crete, would undermine its status as an energy hub powering Europe (TRT, 2020). Alternatively, Chevron may choose not to support EastMed but then lose revenue by not being able to transport gas to a larger market in Europe.

Israel would also like Chevron to promote the Eastern Mediterranean Gas Forum (EMGF) that Israel formed with Egypt, Greece, Cyprus, Jordan, and the Palestinian Authority (Sukkarieh, 2021). The goal is cooperation rather than competition and overcoming the baleful politics of the East Mediterranean—Turkey threatening Cyprus, Hezbollah threatening Israel, and populism delaying Israeli energy development. Such a forum has significance, in a maritime strategic evaluation, for the entire Eastern Mediterranean, beyond the issue of gas production.

Chevron did not play a significant role in either the EastMed or EMGF in its first year of operations in Israel, from October 2020 to October 2021. Yet it is well within its capability should it wish to do so, as demonstrated when it and other partners signed an agreement under which Israel Natural Gas Lines Ltd. will lay a new subsea pipeline and expand some of its existing ones to export to Egypt. It is possible that Chevron could respond differently to the EMGF and EastMed pipeline in the future. Added into the equation is a new government in Israel including changes in cabinet ministers, among others for Energy, Finance, and Foreign Affairs all with different priorities and interests compared to their predecessors. Only time will tell what will transpire.

The UAE and the Abraham Accords

The State of Israel as a regulator promotes competition, in part to prompt efficiency and safety and in part to reduce costs and increase profits. At the same time, the state works to reduce or prevent monopolies that could lead to the opposite. Chevron is prevented at this time from further bidding by the Committee for Reducing Business Concentration because of anti-monopoly legislation and practices.

Chevron's global connections and status can play a significant role without it having an increased stake in ownership. There can be mutual benefits through strategic endeavors to further Israel's increasingly successful diplomatic efforts, for example, the Abraham Accords signed in September 2020.

There are inferences that this is already happening. The Chevron takeover of Noble is not the only deal on the market. Another is for Delek Drilling, under orders

from Israel, to sell its stake in Tamar by December 2021 to prevent a monopoly situation. In April 2021, there were market rumors that Scotland's Cairn Energy was in negotiations with Delek. There were also suggestions that Chevron had a role in finding an alternate purchaser: the United Arab Emirates' Mubadala Petroleum whose board of directors is led by Abu Dhabi Crown Prince Mohammed bin Zayed, a key figure in the Emirati decision-making system.

On 2 September, it was announced that Delek had finalized a deal to sell its 22 percent stake in the Tamar gas field, operated by Chevron who has a 25 percent stake, to Mubadala for about $1 billion making it the biggest commercial deal to be signed between Israeli and Emirati groups (Odenheimer, 2021). This deal, along with exporting gas to Egypt and Jordan, are actions on the ground that could be indisputable proof, that economics and politics go hand in hand, and that Chevron and Israel are working together for mutual interests and benefits in a strategic partnership.

The Security Aspects

In its first year in Israel, Chevron has experienced the full spectrum of the unique relations between the State of Israel, its citizens and private companies. For example in the ongoing security situation with terrorist groups. There are two main features of this unique relationship, compensation legislation and the Israel Defense Forces (IDF).

First, but beyond the scope of this article, is whether Chevron or other companies would be compensated and by how much if the gas platforms were to be closed during a security event. Any sustained closure could no doubt lead to substantial financial loss and place the very existence of any company in doubt. Israel's government decides when to close and restart production; Chevron and other companies do not.

Such a topic is more real than theoretical, for example, during IDF Operation Guardian of the Walls. On 12 May 2021, Chevron shut down and depressurized the Tamar gas platform at the direction of the Ministry of Energy. It is located 25 kilometers offshore from the city of Ashdod, which was under rocket fire from Gaza. Chevron was instructed to restart operations nine days later, and production reached full capacity within thirty-six hours of its restart (Bousso & Rabinovitch, 2021).

Second, the IDF's mission is not only to protect the gas platforms for the benefit of their owners, but also because they are of strategic significance to Israel. By 2020,

75 percent of the electricity generated for domestic and industrial use in Israel has been from the gas drilled from these platforms (Israel Defense Force, 2021)

The Israeli Navy (IN) is an important branch of the IDF whose roles include protecting the new gas fields, desalination plants, and ports, shipping, and shipping routes for the vast majority of Israel's imports and exports are by sea. There are constant threats in the maritime space and landward from terrorist organizations and other states, as well as drug and gun smugglers and violators of environmental and fishing regulations.

There are significant risks facing the gas fields and especially the gas platform infrastructure from rockets and missiles launched from ships, from landward Gaza and Lebanon, and from unmanned drones. The complex decision of how to ensure their security is taken by the IDF and not by Chevron or other companies and includes weapons procurement at the expense of the State of Israel.

For example, a contract was signed to purchase four new Saar 6 corvettes in May 2015 manufactured in a German shipyard. An interim measure was to install the land-based Iron Dome missile defense system on existing warships to protect the gas platforms. All four were handed over to the IN during Chevron's first year in Israel—the INS *Magen* in November 2020, the INS *Oz* in May 2021, and the INS *Atzmaut* and INS *Nitzachon* on 27 July 2021 (Manaranche, 2021).

Each ship has advanced systems that can quickly assign the right interceptor for a rapid hard kill of adversarial projectiles. They are also equipped with advanced electronic warfare capabilities for a soft layer of defense. This multilayered defense of the gas rigs forms a virtual and real fence that will protect them against an array of threats.

With the Saar 6 the IN could also have a broad shift in naval doctrine in two directions, if it so chooses, given their capabilities. The first shift could be to a greater Brown Water doctrine, which places a focus on sea-to-land combat, founded on the building block of interconnectivity. That means a joint air-sea-land situation picture and a new level of interoperability between the Navy and the Israel Air Force (Lappin, 2021).

The second shift could be toward greater power projection. With the Saar 6 the IN has gained a significant extra strategic maritime capability. The IN is now capable of defending more maritime areas further from Israel's coast and beyond Israel's Exclusive Economic Zone (EEZ) for a longer period of time, including the EastMed pipeline; moreover, it is also capable of projecting forces for other national security interests.

Chevron and Local Companies

The energy infrastructure in Israel can be a complex economic-security issue. In 2021 it was not evident that Chevron was working to achieve a win-win outcome. An example is relations with the Israel Electric Corporation (IEC) that is 99.85 percent owned by the State of Israel, who through the Public Utilities Authority for Electricity is also its regulator. The IEC runs the only national electricity grid and supplies almost all the domestic and industrial needs (Israel Electricity Company, 2021).

By 2020, 75 percent of the electricity generated for domestic and industrial use has been from the gas drilled from the platforms in the Tamar and Leviathan fields, where Chevron is the largest stakeholder. Within days of Chevron's entry into Israel in October 2020, the Israeli Antitrust Authorities announced its intention to investigate it. The catalyst was a new agreement that the IEC had reached with the Tamar partners for about 10 percent less than the price agreed in a separate previous deal for Leviathan gas. Chevron decided not to sell gas to IEC and was allegedly abusing its large stake in Israel's natural gas holdings to keep electricity prices high.

The dispute was resolved in January 2021 with estimated savings of $35 million for the IEC and for Israeli consumers. This was before the regulator investigated. Chevron was reminded that the contract between Noble and the IEC, which Chevron said it would respect, includes a clause that allows the IEC to veto any change to the price at which gas is sold to the IEC. Chevron realized that it had a contractual obligation it could not rescind (Yeshayahou, 2021).

A somewhat better relationship arose when Chevron awarded Israel Shipyards a 16-month coating repair service contract for offshore and onshore facilities, in collaboration with a British company with the requisite expertise to assist and in implementing the localization program. That includes training of Israeli workers, project managers, and coating inspectors and their gradual integration into the project (Offshore Staff, 2021).

Scandals and the Environmental Aspects

While there is optimism that Chevron will play a positive role, there are also allegations leading to causes for concern. These relate to accounting practices, labor relations, environmental matters, and human health. Any of these could have a significant and detrimental impact in the geo-strategic space of a small demographic and geographic country such as Israel.

Many experts and local and international environmental groups gave evidence to a Knesset committee and at the fore were alleged irregularities in environmental matters. The committee was informed of allegations in thirty-one countries where Chevron has left a trail of environmental and humanitarian disaster (Surkes, 2020).

In Israel, there were alleged irregularities in accounting practices. Quoted was an investor in Noble who sued in a New York federal court about a materially incomplete and misleading registration statement lodged with the US Securities and Exchange Commission that had been used deceitfully as a bid to persuade shareholders to approve Chevron's takeover.

The Knesset committee was also told about alleged irregularities pertaining to labor relations. Upon taking over Noble, Chevron declared an estimated run-rate synergy of about $300 million a year. It noted that such synergies in part would be related to cutting its workforce in Israel and reducing the number of office buildings, information technology, and insurance costs. Indeed, since May 2020 Noble had already begun to lay off dozens of employees in Israel as part of a streamlining plan. This could lead to a reduction in safety and service that the company provides its customers.

When the Knesset committee challenged the government on all these examples, as is its obligation in the parliamentary process of oversight and checks and balances, it was disclosed that the government was going to approve the Chevron takeover of Noble but without checking the allegations and its environmental past.

Conclusion

Chevron's first year in Israel can be viewed as a prototype—a work in progress. Thus far, it appears good for Chevron financially after its acquisition of Noble, but what does it do for Israel?

October 2020 to October 2021 has not been an easy year for anyone. Chevron has not had prior experience in working in Israel's unique and complex economic-security environment nor with such a strong regulator as the State of Israel.

In turn, Israeli companies, both state and private, and most citizens have not had experience in working with such a large global corporation as Chevron. Their experience with large US corporations has been in the defense sector with the US government playing a major role. This is not the case with Chevron.

Looking forward positively is with the hope everyone has learned that the way forward for a win-win outcome is to work together, to understand each other, and to make compromises when needed. In doing so Chevron can become an even more significant strategic maritime and economic partner to the State of Israel, Israeli companies (both state and private), and citizens as well as to Israel's partners in the region, predominately Egypt, Jordan, Cyprus, and the UAE.

What's next? Chevron has the capital and presence in all the key countries to make the EastMed pipeline happen. This may be the only means it has to substantially increase its sales and thus its profits. Israel as a strong regulator will not permit Chevron to bid for or to gain a larger stake of the gas fields, or even increase prices to the IEC and its consumers. Israel will insist that Chevron does not cut corners to reduce costs that would result in labor issues, health and safety dangers, and environmental catastrophe. A functioning EastMed pipeline could also have positive ramifications for regional politics. For the Israel Navy, it has four new warships of a type and capability never before commissioned, thanks to the gas fields' direct security needs, permitting a Brown Water doctrine shift while enabling enhanced power projection capability.

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Section 4: Dangers in the Maritime Domain

Many dangers are associated with the sea, from security to environment. The two articles in this section deal with issues that deserve attention: the hazards of transferring dangerous goods in ships and black carbon emissions from ships, particularly around ports and port cities. The articles discuss methods to deal with these issues, from regulation that needs to be enforces to practical solutions to limit the damage.

Hazards of Transport of Dangerous Goods in Ships

Aleksander Gerson

Maritime transport constitutes 80 percent of the total global transport of commodities (approximately 11.5 billion tons annually). Due to their significant advantage in size ("economies of scale") over any other mode of transport (whether air- or land-based), ships can transport goods economically and cheaply all over the world. The State of Israel, the Mediterranean Sea's eastern-most country and a "geo-political island," is uniquely dependent on maritime transport for import and export, comprising up to 99 percent of Israeli international trade. Even though bulk seaborne merchandise (liquid or dry), such as ore, grain, crude oil, and all petrochemical products constitute the largest portion of global trade, this article focuses on transport of Dangerous Goods (DG) in container ships, an area in which the most significant increase in vessel size has occurred (approximately sixteen-fold over the past fifty to sixty years), including the volume of goods transported and DG carried.

There is a clear financial incentive for ship owners and operators to transport increasing quantities of containers carrying DG. Carrying this out safely requires in-depth knowledge of the risks involved for any hazardous substance (manufacturing, packaging, loading, and locating on board), and careful consideration of the interface between DGs and the ship and its crew. Carrying DG aboard ships currently involves very sophisticated computations and planning in order to minimize risks to security, safety, and contamination of the marine environment. The world regulator (International Maritime Organization, IMO) and shipping company owners have not yet adapted their policies and procedures sufficiently to keep up with the impact and consequences of the dramatic changes in container ship size.

This article discusses the global changes and trends in transportation of DG in containers in increasingly large ships (mega-ships), their inherent problems, the Israeli perspective, and whether the State of Israel is prepared for the future in this respect.

Background

Container vessels of the 1960s carrying 1,500 TEU (Twenty-foot Equivalent Unit) containers were considered large ships and would typically each carry several to a few dozen containers of hazardous materials. That size is now dwarfed by current container ships carrying 24,000 containers (Ultra Large Container Ships, ULCS), which is the current norm and constitutes a sixteen-fold increase over the past fifty to sixty years. As the cost of transporting a container with DG is relatively high, increasing the quantity of DG containers offers obvious economic benefits for ship owners. The larger the vessels, the greater the quantities of DG they carry, often several hundred such containers per vessel. The downside of this trend is an increase in risks (security, safety, and contamination of the marine environment).

The need for international regulation of transport of DG at sea was already recognized in the 1929 Safety of Life at Sea (SOLAS) Convention, which recommended

formulating internationally recognized standards. Classification of DG and initial regulations regarding their carriage ensued and were approved by the 1948 SOLAS Committee. The Committee also decided to continue to develop further international conventions, codes, and regulations.

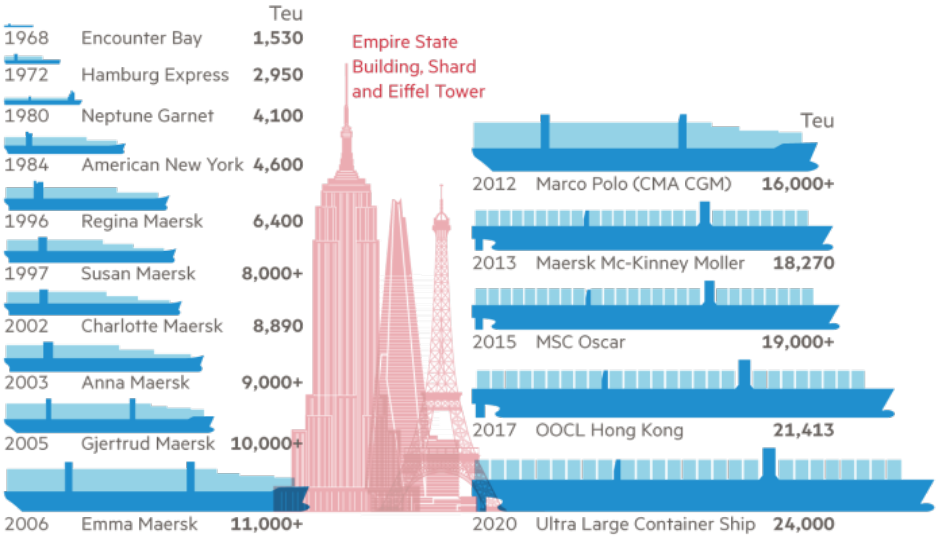

Figure 1: The growth of container ships in the past fifty years[1]

The major achievements in this field are enshrined in the following Conventions:

- SOLAS Chapter VII – Carriage of DG
- SOLAS Chapter II-2 – Construction – fire protection, fire detection, and fire extinction
- International Maritime Dangerous Goods Code (IMDG Code)[2]
- State of Israel legislation – (Ports Regulations 1982), Chapter 16a

Of 250 million containers transporting goods around the world every year, approximately 25 million (10 percent) contain DG of many different types. Hundreds of millions of tons of DG are transported in liquid or dry bulk. These include toxic and corrosive chemicals, substances that release combustible and noxious gases in contact with water or are susceptible to spontaneous combustion, fuels of various kinds, liquified or compressed gases, such as LNG (Liquefied Natural Gas) and LPG (Liquefied Petroleum Gas).

1 "Too big to sail? The debate over huge container ships". *Financial Times*, March 28, 2021.

2 https://imo.org: IMDG Code 40-20.

Preparing DG for transportation, starting at the manufacturer's plant, packaging, loading, transporting them in often unpredictable and rapidly changing and extreme weather conditions—these require highly trained and skilled personnel both ashore and at sea. The IMO has issued multiple regulations and codes to minimize the dangers of transporting DG, alongside regulations issued by other relevant important international bodies such as Lloyds, American Bureau of Shipping (ABS), Bureau Veritas (BV), Det Norske Veritas (DNV), Germanische Lloyds (GL), International Association of Independent Tanker Owners (INTERTANCO), The Society of International Gas Tankers (SIGITTO), International Chamber of Shipping (ICS). However, in case of a serious incident occurring at sea involving DG, ships' crews have very limited means at their disposal for tackling such an event.

Case 1 – The burning and foundering of the X-*Press Pearl* with its total cargo of 1,500 containers in May 2021 (fortunately the ship was close to the Sri Lanka shore and the crew was rescued prior to the explosion and spread of the fire) caused not only economic damage but also serious environmental damage in the relatively shallow coastal waters of Sri Lanka, the extent of which has not yet been determined. Although formal results of the inquiry have not yet been published, apparently a leak from a container with nitrous acid caused the huge fire (the mechanism has still not been clarified). The CEO of X-Press Carriers has stated that in view of the total loss and foundering of the vessel itself, the inquiry is likely to take a long time. Due to the extreme temperature, most of the fuels and oils were burned or evaporated, therefore contamination of the sea with fuel and oil was largely limited, a relatively "fortunate" result of the incident. This event raised public awareness (at least locally) to the dangers to life and the environment caused by transport of DG.

Figure 2: The burning and sinking of X-*Press Pearl*, May 2021

Case 2 – In February 2021, Israel suffered an event of contamination of the shore from the release or leak of approximately 1,000 tons of crude oil. However, this damage is incomparable in its significance to the possibility of a marine accident involving a mega container ship (these ships can carry 8,000–6,000 tons of fuel on board) in the vicinity of Israel's shores. Soon, such ships will be arriving regularly at the Haifa and Ashdod ports.

A recent meeting of marine insurance firms that convened in London due to the concerning number of fires on large container ships[3] in the last five years highlighted a possible correlation between the incidence of fires and the substantial number of mis-declarations (aimed at saving shippers' expenses) of containers' contents.[4]

Identification of an oil stain at sea is relatively simple, however contamination with dangerous chemicals, some of which are extremely noxious, may be invisible, difficult to identify, and almost impossible to decontaminate.

Is the State of Israel ready to effectively supervise its marine waters and ports?

Dangerous Goods (DG) are classified into nine categories

1. Explosives (Class 1) 
2. Gases (2.1 Flammable; 2.2 Non-flammable or toxic; 2.3 Toxic) 
3. Flammable Liquids (Class 3) 
4. Solids (4.1 Flammable; 4.2 Liable to spontaneous combustion; Emit flammable gases in contact with water) 
5. Oxidizing Substances (5.1 Oxidizing agent; 5.2 Organic peroxides) 
6. Toxic and Infectious Substances (6.1 Toxic; 6.2 Infectious) 
7. Radioactive (Class 7) 
8. Corrosives (Class 8; Acids and Bases) 
9. Other (Class 9)  and Marine Pollutants 

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3 Insurance Marine News, "Marine Insurance London: Fires on containerships – solutions still elusive", *International Union of Marine Insurance (IUMI)*, December 9, 2020.

4 Mike Wackett, "Zim develops early detection software for cargo misdeclarations", theloadstar, August 17, 2020; Mike Wackett, "The need for change: container shipping is an 'accident waiting to happen'", theloadstar, November 8, 2021.

An additional list of High Consequence DG (HCDG) includes those with potential for misuse in a terrorist event and may result in serious consequences such as mass casualties and mass destruction, particularly for Class 7 (Radioactive), "mass socio-economic disruption" (IMDG Code Vol I -1.3.4.1.2).

Case 3 – Explosion on board the ammunitions ship SS *Mont Blanc* in the port of Halifax, Nova Scotia, Canada, in 1917 destroyed the port and half of the city and caused 2,000 casualties. If a catastrophe of similar proportions was considered unlikely today, the proof of the contrary was provided by an explosion in the port of Beirut in 2020 when 3,000 tons of ammonium nitrate (a fertilizer) exploded, destroying the Beirut port, and caused 218 fatalities and 7,000 injured.

Figure 3: Explosions of DG at Halifax port (1917) and Beirut port (2020)

Table 1:

Types of HCDG		
The following United Nations (UN) numbers are considered HCDG. UN Numbers are a globally recognised way of labelling dangerous goods[5]		
UN Number	Proper shipping names	Class division
3375	Ammonium nitrate emulsion or suspension or gel, intermediate for blasting explosives	5.1
3139	Oxidising liquid, N.O.S.	5.1
1942	Ammonium nitrate with not more than 0.2% total combustible material, including any organic substance calculated as carbon, to the exclusion of another added substance	5.1

The table above lists a few examples of HCDG carried in ships that require special precautions and care during storage, loading, and discharging. Ammonium nitrate poses three main risks:

5 https://imo.org: IMDG Code 40–20. Chapter 1.10.3.1.

- **Decomposition** – Ammonium nitrate melts at 170°C, and above 210°C it decomposes and releases a toxic gas
- **Fire** – Ammonium nitrate, whether solid or liquid, is an oxidizing agent, which can release oxygen to "fuel" burning, even in an oxygen-poor environment
- **Explosion** – In the presence of fire, ammonium nitrate can melt and behave like liquid, which in a confined space may explode, causing a huge shock wave and a cloud of toxic gas capable of spreading thousands of meters around the explosion site. It should never be stored alongside organic substances, fuels, oils, and especially heat sources.[6]

HCDG substances can appear under all classification categories (1–8), depending on their quantity and/or danger category.

Some shipping companies refuse to transport high risk substances such as radioactive materials, substances with wide flammability ranges (very low Flash point, minus 30°C), such as Carbon Disulphide (UN1131), which can auto-ignite at just 100°C.

or substances that have a potential for spontaneous chemical reaction above a certain temperature (SADT – Self Accelerating Decomposition Temperature), such as Class 5.2 organic peroxides.

The above are transported in reefer containers that, in addition to the electrical motor connected to ship's main power supply, are equipped with an autonomous diesel motor. They are also equipped with an audio-visual alarm and a GPS transponder that will send an alarm if the temperature rises above the safety limit.

Most ports also limit transit of explosives and radioactive substances. If permitted, these are transported in limited quantities and need to be managed by specialists. Some ports also limit transport of other kinds of DG, such as especially flammable liquids with a wide flammability range and low SADT Class 4.2 substances, some of

6 https://imo.org: IMDG Code 40-20. Chapter. 1.10.3.1

which may be classified as explosives, for example, nitroglycerin diluted in alcohol (UN 0144).

Case 4 – A ZIM-line ship loaded a container classified as Class 5.1 temperature sensitive in China (Calcium Hypochlorite, UN 1748). This substance is used for sanitizing swimming pools and, on the face of it, is not an especially dangerous substance. The shipper did not report the container's content as required, and it was loaded in a hold adjacent to the engine room bulkhead, which radiates heat from adjacent machinery. After several days at sea, the container exploded and a fire started and spread inside the hold. Fortunately, the ship's crew were alerted, stopped all ventilation to the hold, and released all CO_2 bottles available on board. This stopped the spread of the fire but did not extinguish it. The ship had arrived, in the meantime, at Port Suez (Egypt) and notified the authorities of the incident. In the absence of any remaining CO_2 bottles on board, the ship was not permitted to traverse the Suez Canal, it was detained for a few days until all CO_2 bottles were refilled ashore and returned to the ship and the fire fully extinguished. This case demonstrates the importance of crew alertness and readiness for immediate response, but also the utmost importance of accurate declaration by the shipper regarding the contents of the container. In this case, the ship was saved by the actions of the crew in blocking the spread of the fire.

Following this incident, the ZIM company discontinued their connection with the exporter/shipper of the container. Conclusions following from the event were embedded in the company's regulations for transport of DG (and this type of chemical in particular) and in the safety policy of the company (SMS).

Loading DG Containers on Ships

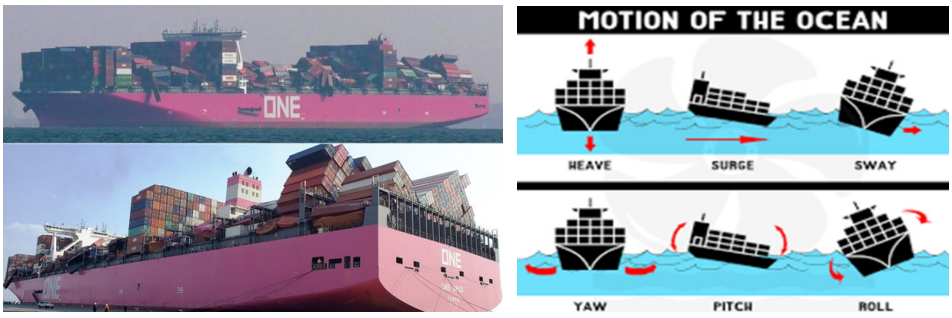


Figure 4: Motion of the ocean (left) and possible results (right)

The international code for transporting DG at sea (IMDG Code) sets out strict and obligatory measures to prevent or minimize risk in case of accident (e.g., collision), structural damage to the vessel, grounding, container collapse due to exceptionally rough sea (parametric rolling), or any other urgent occurrence (especially fire).

IMDG Code requires the following measures (among others):

- Submission of a Shipper's Declaration detailing the industrial/commercial name of the substance, UN Number, packing certificate (signed by a certified packer), classification of the substance and any sub-classification if relevant (main/ primary risk and secondary risk), ship's plan and precise location for loading the container and net weight of the dangerous substance.
- Certificate of cleaning containers or washing empty iso-tanks that previously contained dangerous substances. In the absence of such a certificate, the container is considered to contain a dangerous substance.
- Category of packing, instructions for emergency procedures in case of any structural damage to the container's integrity, including contact numbers of the shipper/manufacturer 24/7 in case of urgent need for further advice. The ship is required to carry a Document of Compliance (DoC) detailing which cargoes the ship is certified to carry in each of its cargo holds.
- Loading plan approved by the Israeli Ministry of Transport, detailing horizontal and (vertical) tier separations. Tier separation requirements are very strict for flammable liquids (Class 3) or corrosive liquids (Class 8), due to the concern of possible leak; in some cases, the most stringent "4" (see below) separation is required, where even separation by a continuous steel deck is insufficient, and a significant additional horizontal distance is required.
  - "away from" – minimum 3 meters distance between containers
  - "separated from" – minimum 6 meters distance between containers
  - "separated by a complete compartment or hold from" (on deck, minimum 24 meters apart)
  - "separated longitudinally by an intervening complete compartment or hold from" (horizontally)
- Liquid cargoes or noxious gases are required to be distanced from accommodation and engine room ventilation systems.
- If the ship is carrying flammable or noxious liquids in the holds, it is obliged to have a dedicated system for pumping hold bilges, which is separate from the ship's engine room where all other pumping arrangements are located (SOLAS II-2/19).

- The ship must be fitted with a central CO_2 fire extinguishing system for releasing the gas into the engine room or any single hold. Certain chemicals require specific fire extinguishing media, for example, Lithium (UN 1415), which needs to be delivered on board prior to loading that specific cargo.
- If the ship is loading Class 1 explosives, loading is carried out under direct supervision of a Ministry of Transport Inspector. Prior to loading, the container is examined for structural integrity, and it should have regular periodic testing of its integrity (ACEP). Once the cargo is secured in the container and a certified electrician carries out an Electrical Continuity–Megger Test, an appropriate certificate is then issued.
- Flammable materials are loaded into a hold only after ensuring disconnection of the electrical supply to the hold by physically removing fuses from the main electrical board.
- If oxidizing substances (5.1) are loaded in bulk, the ship needs to prove its ability to maintain residual stability in the event of flooding of two holds with water (CO_2 is ineffective in extinguishing a fire cause by oxidizing substances); loading is carried out under supervision of a Ministry of Transport Inspector.
- Highly flammable cargoes (IMDG Code 7.2.7.1.3) cannot be loaded onto a ship carrying Class 1 explosives. These flammable cargoes and other substances susceptible to spontaneous temperature-dependent reaction are subject to a minimal separation from crew accommodation and/or heat or source of possible ignition. Reefer containers come under the category of a potential source of ignition.

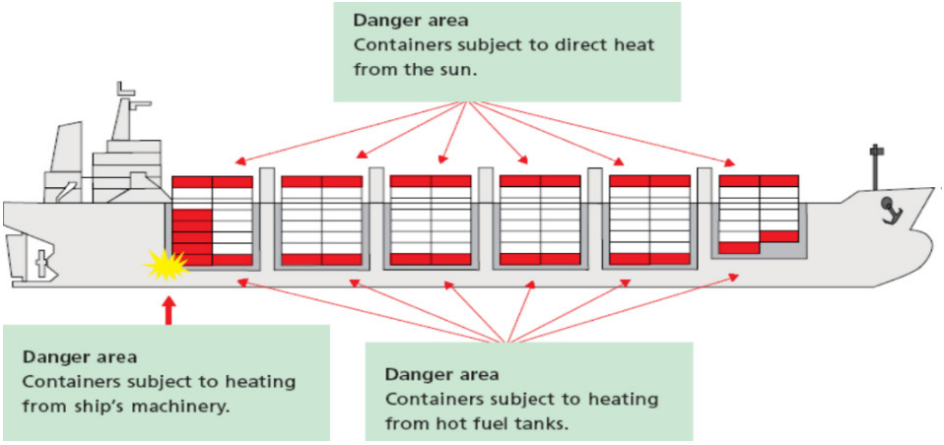


Figure 5: Areas on a ship that could be affected by high temperatures[7]

7 https://www.ukpandi.com

Due to strict separation requirements below deck, loading planners prefer loading containers with DG on the deck (Class 1 containers and flammable substances with susceptibility to spontaneous combustion in particular). Certain substances can only be loaded on the deck and in proximity to the ship's side, where in case of emergency they can be pushed overboard (at least in theory, as container ships have no lifting appliances) or can be isolated more easily in case of explosion or fire.

Loading Above or Below Deck

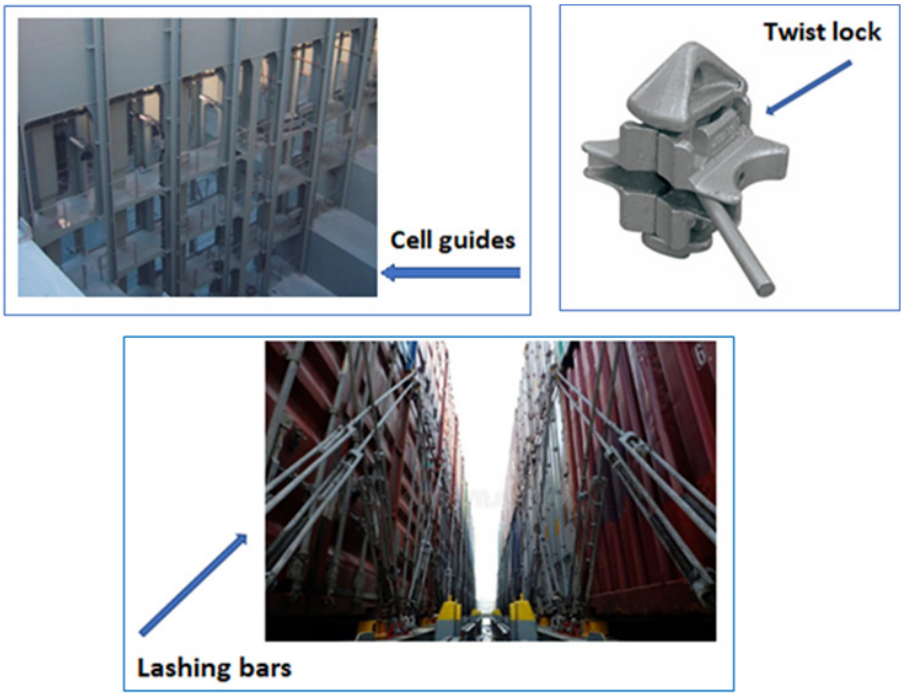


Figure 6: Various tying means to secure containers

There are advantages and disadvantages for loading above or below deck. As already mentioned, segregation rules (Chapter 7.2 of IMDG Code: General segregation provisions)[8] on deck are less stringent and access to containers (at least the lower tiers) is easier. However:

- Lashing bars on deck that connect to the ship's hull can usually reach up only to the fourth tier of containers on deck. Above this height containers are only secured to one another by twist locks at their four corners.

8 The International Maritime Dangerous Goods (IMDG) Code.

- When the sea is very rough, work on deck can be hazardous, especially accessing containers stacked high, in case some fault is suspected.
- In case of strong rolling, container ships are under some circumstances susceptible to parametric rolling and container lashing may fail. If containers containing DG collapse, there is danger of contact between substances that can cause a severe chemical reaction, resulting in potential catastrophe, such as fire or loss of the entire vessel.
- Containers stored inside a ship's hold under deck are stacked within Cell Guides and are therefore more secure in the face of waves and heavy spray in rough weather including all ship's movements at sea. However, transport underdeck may be more costly and segregation more stringent.

When Is Large Too Large and What Can Be Done?

There are many aspects to the problems of transporting dangerous goods containers and particularly in mega-ships. Numerous accidents were caused by collapse of a container stack onto the deck; however, the causes are not always clear. Probable factors may be intrinsic factors of the container, lashing, overloading, sub-optimal spread of weight, incorrect prediction of the ship's movements in rough sea and inadequate lashing calculations.

The current methodology for calculating the forces relies on an assumption of three to five tiers of containers. However, with growth of container ships, these calculations have become overly complex. By the time the ship's software, if at all capable, can calculate all the loading parameters, the ship will have left port and making any adjustment becomes impossible.

Ship operators continue to consult the *Cargo Securing Manual,* which is calculated for ships of Panamax size (maximal ship size that can traverse the Panama Canal), however, this is no longer sufficient for much larger ships with multiple tiers of containers on deck.[9]

Case 5 – While writing this article, news arrived of a fire on board the ZIM *Kingston* with a loss of 109 containers, which fell into the sea opposite the Canadian shore. Apparently, the ship encountered severe weather, which caused collapse of part of the container lashings, some containers contained Xanthates, which ignited.

9 Louise Vogdrup-Schmidt, "Lloyd's Register: 24,000 teu ships on the way". *shippingwatch*, October 16, 2014.

Figure 7: Collapsed containers due to severe rolling

Figure 8: Damage and burn due to collapse of containers, ZIM Kingston, October 2021[10]

Hazards from xanthates include, but are not limited to:

- production of toxic or flammable decomposition products (carbon disulphide* (CS2) and potentially alcohol vapors)
- spontaneous combustion that creates toxic combustion products (sulphur dioxide, carbon monoxide, and carbon dioxide)
- low order explosions from ignition of decomposition products
- acute harm if ingested or significant amounts absorbed through the skin
- acute irritation if inhaled or absorbed on skin surface.

This severe event demonstrates the hazards related to transport of DG at sea and the susceptibility of container ships to violent and sometimes unpredictable rolling. Spraying water directly into the containers was impossible in this case, as the chemical causing the fire releases a flammable gas when it comes into contact with water. Getting the fire under control took seven days. Pollution of the marine environment occurred, as some containers and debris were washed ashore. If it were not for the proximity to the Canadian shore and immediate assistance from the well-equipped Canadian Coast Guard, this accident could have had dire consequences. The Canadian authorities (CTSB) intend to investigate all of the aspects related to the accident, including the captain's decision not to seek shelter despite all warnings of an imminent storm. Danaos, the operators of the Malta-flagged vessel, have so far declined any comment.

[10] Mike Schuler, "ZIM Kingston Cargo Fire Stabilized and Ship Held Overnight, Canadian Coast Guard Says", *gCaptain*, October 25, 2021.

Robust and Smart Containers

Case 6 – The collision between the container ship *Ever Decent* and the passenger ship *Norwegian Dream* in 1999 in the English Channel triggered a change in the SOLAS Convention. The force of the collision caused containers to detach and land on the prow of the passenger ship; fire broke out in containers containing paints on board the *Ever Decent*. The *Ever Decent* was severely damaged by the collision and the fire and had to be towed to the nearest port.

Figure 9: Damage from collision of container ship *Ever Decent* and passenger ship Norwegian Dream in 1999

Following this incident, since 2016 a water-mist lance is obligatory as part of the fire-fighting equipment on ships. This can penetrate the side of the container, a simple but effective means of combatting fire in a container when every second makes a difference. It has been suggested that in the future each container will be equipped with a fire-extinguishing system, which will be connected to the ship's central fire-fighting system, somewhat similar to the inert gas system in place in every modern tanker. The industry also considers using austenitic steel in container construction.

Figure 10: Water-Mist Lance, capable of penetrating the container's side

Despite all the regulatory improvements, false declarations made by dishonest shippers still constitute a significant problem. Another problem is the tendency of ship operators to ignore the need to recover containers that have dropped into the sea and are considered pollutants according to Annex 5 of MARPOL. Obligatory fitting of containers with a transponder will facilitate their identification and location if they fall into the sea, especially those that contain hazardous, noxious, or polluting substances might help to solve this issue.

Hazards of Transport of Dangerous Goods Containers at Sea and Size of Container Ships — "Communicating Vessels"

As mentioned, economic pressures and the wish to minimize the voyage duration even in stormy weather, are triggers for building ships of ever-increasing size with considerable costs. Delays in arriving at a loading or discharging port within the designated timeframe of a ship that costs 100,000 USD per day to operate will inevitably trigger insurance claims by shippers and recipients when the continuity of the logistic chain is disrupted. Commercial pressures from owners or charterers in turn will be delegated to ships' command.

ISM Code-MSC Resolution MSC.275(85), related to safety management code for ships, states that it is up to the ship's operator to "assess all identified risks to its ships, personnel and the environment and establish appropriate safeguards."

IMO states that masters and deck officers serving on Ultra-Large Container Ships (ULCSs) are required to undergo training in parametric and synchronous rolling, which constitutes a danger to the ship and the cargo (IMO MSC Circ. 1228, 2007), as part of the regulations regarding safety of navigation in unusual weather circumstances.

Recent publications and the numerous adverse incidents involving DG in recent years indicate that the world regulator (IMO) and shipping company owners have not yet updated their approach to consider the dramatic changes in container ship size and the updated training requirements. The recent blockage of the Suez Canal by the ULCS *Ever Given* (March 2021) has highlighted this issue. Even though there was no involvement of DG in this incident, it should serve as a wake-up call to the shipping community as to the extent at which a serious incident in ships of this dimension can be complex and trigger wide-reaching consequences, especially in bottleneck areas such as the Suez Canal.

A large-scale incident involving DG with potential loss of lives and environmental pollution should be pre-empted, especially in ecologically vulnerable areas. A

coastal state such as the State of Israel, with heavy marine traffic occurring not far from its shores (to and from the Far East through the Suez Canal), should prepare for the eventuality of an extreme incident with mass casualties and large-scale marine pollution. It is imperative for the State of Israel to introduce a consolidated plan for tackling potential large-scale incidents involving marine pollution and/or loss of life. This should be achieved in collaboration with neighboring countries and as soon as possible.

Acronyms and Abbreviations

Classification Society – A non-governmental organization that establishes and maintains technical standards for the construction and operation of ships and offshore structures.

Class (IMDG) – Classification of Dangerous Goods in accordance with the Code (1–9)

CTSB – Canadian Transportation Safety Board

Flammable Range – The explosive flammable range of a combustible gas or vapor is the range between the lower exposure limit (LEL) and the upper exposure limit (UEL) for that particular gas or vapor

Flash Point – The fire point is the lowest temperature at which the vapours keep burning after the ignition source is removed

IACS – International Association of Classification Societies e.g. American Bureau of Shipping. Lloyds Register, ClassNK, Det Norske Veritas, Germanische Lloyds, Registro Italiano Navale etc.

IBC Code – The International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk

IGC Code – International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk

ICS – International Chamber of Shipping

INTERTANKO – International Association of Independent Tankers Owners

ISM Code – International Management Code for the Safe Operation of Ships and for Pollution Prevention

LC/LD 50 – LD50 (median lethal dose) for acute oral or dermal toxicity, LC50 for acute toxicity on inhalation

MARPOL – The International Convention for Prevention of Marine Pollution from Ships

MSC – Maritime Safety Committee

MEPC – Maritime Environmental Protection Committee

NGOs – Non-Governmental Organizations (see Classification Societies)

SIGTTO – The Society of International Gas Tanker and Terminal Operators

SMS – Safety Management System (ISM Code)

SOLAS – The International Convention for the Safety of Life at Sea

TEU – Twenty foot equivalent

ULCS – Ultra Large Container Ship

UN number – (United Nations number) is a four-digit number that identifies hazardous materials, and articles (such as explosives, flammable liquids, oxidizers, toxic liquids, etc.)

Black Carbon Emissions from Ships in Israeli Ports

***Merav Gonen*[1]**

Introduction

Ships are vital to global trade. They transport approximately 90% of all world trade and are the most efficient means of transport for transporting goods. Despite the advantages and importance of the shipping sector, emissions of air pollutants from ships include substances which are harmful to health and to the environment. The emission of pollutants into the air is partly caused due to the poor quality of fuel used by the shipping sector. The main pollutants emitted from ships include gases such as nitrogen oxides (NO_x), sulfur oxides (SO_x), and particulate matter (PM). One of the particulate substances is black carbon, which is emitted during incomplete combustion of fossil fuels, and is the main component in soot. It is estimated that each year some eight million tons of black carbon are emitted into the atmosphere from different sources of combustion, of which the shipping sector is estimated to emit approximately 130,000 tons. Besides the detrimental impacts on health, black carbon has climate impacts as well. It is the second cause, after carbon dioxide, of global warming from the shipping sector.

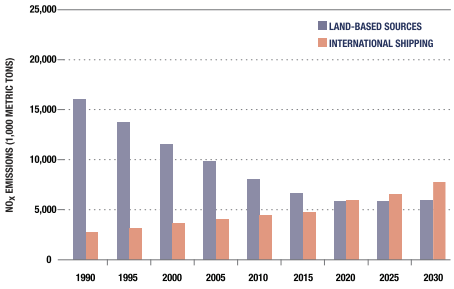
An analysis of global ship traffic shows that a substantial part of ship emissions takes place close to shore or to shipping lanes. The estimate, and it is estimated that 80% of all ship emissions occur within a range of up to 400 km from the coastline. The most significant ship activity segment, in the context of health impacts is the segment in which the ship is berthed in port. Since ports are mostly located close to cities and population centers, ship emissions occurring while the ship is berthed in the port area have a more significant impact on the air quality around the port and on the health of the population living in the nearby city. Studies show that in port cities, the port activity contributes 50% of the total particulate emissions in the urban area.

Emissions of Air pollutants from the shipping sector

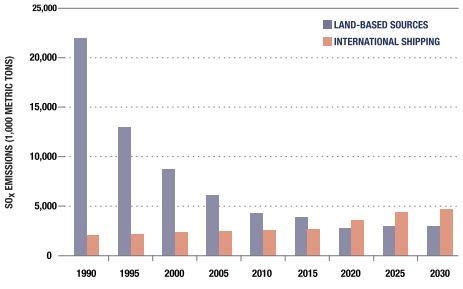
Ships are considered to be the most efficient means of transport in terms of tons of goods transported per ton of fuel. Also, compared with other means of transport such as trucks or airplanes, ships emit the least carbon dioxide in terms of gram per

1 This article is based on research done as part of Master's Degree studies in the Department of Natural Resources and Environmental Management. The author wishes to thank Prof. Ofira Ayalon and Chief Engineer Asher Kadosh for their assistance this article.

ton cargo transported per kilometer. However, when it comes to air pollutants, the shipping sector's contribution is greater. Ship emissions equal, and even exceed, the emissions from land transport: sulfur dioxide emissions from ships are 1.6 to 2.7 times greater than the same emissions from land transport, and nitrogen dioxide and particulate emissions are slightly lower or equal to those from road vehicles (Corbett et al., 1999). Generally speaking, total ship emissions are increasing due to the growth in the volume of global trade, where approximately 90% of the global trade is transported by sea. In addition, regulatory measures taken in the land transport sector (emissions standards for cars and trucks) to reduce air pollutants have resulted in the relative decline in emissions from the land transport sector. Therefore, the relative contribution of the shipping sector to the total greenhouse gas emissions and other pollutant emissions of the whole transport sector has increased. In the European Union, regulations led to reduced emissions from land transport over the past two decades, thus it is estimated that the total emissions of SO_X and NO_X from the shipping sector will exceed the total emissions from land-based sources (figure 1a). The United States' Environmental Protection Agency (EPA) also estimates that shipping contributes 14% to the total NO_X emissions in the USA and that the contribution of the shipping sector to particulate emissions from diesel is approximately 45% (ICCT, 2007).



NO_X emissions estimate in the EU – land-based sources versus international shipping



SO_X emissions estimate in the EU - land-based sources versus international shipping

Figure 1: Estimated land-based emissions versus international shipping in the European Union (NO_X, SO_X). Source: Air Pollution and Greenhouse Gas Emissions from Ocean-going Ships ICCT 2007

Globally, ships are responsible for 14–31% of all nitrogen oxides (NO_X) emissions and for 4–9% of all sulfur oxides (SO_X) emissions. It should be noted that in the past decade, the International Maritime Organization has adopted regulations intended to reduce air emissions of sulfur oxides and nitrogen oxides from ships. The regulations

adopted, as part of the MARPOL Convention, gradually limited the sulfur content in fuels used by ships to 3.5% sulfur beginning in 2012 and subsequently to 0.5% sulfur from 2020. In addition, limits on the nitrogen oxide emissions from ship engines were also imposed, depending on the year the ship was built. Moreover, in areas declared as "emission control areas", a more stringent emission limit is imposed (0.1% sulfur). These restrictions on the shipping sector have been introduced gradually over many years but did not yield a significant emissions reduction due to the growth in the shipping sector. It is hoped that we will see the effects of the regulations after 2020, in SO_x emissions reductions, following the coming into effect of the sulfur content limit in fuels as well as the introduction of emissions control areas in North America and Europe (the Baltic Sea, the North Sea).

Particulate air emissions from the shipping sector

In addition to the air pollutants emitted from ships, which include gases such as nitrogen oxides (NO_x) and sulfur oxides (SO_x), ships also emit particles. Particulate Matter (PM) air pollution usually consists of metals, black carbon, organic carbon, ammonia, sulfates, nitrates, and soil particles (dust). Particulate air pollution from Diesel engines is considered to be more harmful than other sources and it contains a relatively large quantity of black carbon.

One of the reasons for the pollutant emissions from ships is the fact that ships use a relatively poor quality of fuel, known as Heavy Fuel Oil (HFO) or Residual Oil. This type of fuel, (also known as "mazut") is produced at the bottom of the refining process. It is the heaviest commercial fuel that can be extracted from crude oil. It is heavier than gasoline and kerosene. HFO is cheaper than other fuels but it is considered the most polluting. This type of fuel contains more sulfur, aromatic hydrocarbons and ash, which reduce the efficiency of the combustion, and cause increased pollutant emissions, including black carbon (IMO BLG 17/Inf 7, 2012). According to data from the International Maritime Organization, in 2018 the global shipping fleet consumed 339 million tons of fuel, 79% of which were Heavy Fuel Oil. (223 million tons HFO, 102 million tons MDO,[2] 11 million tons LNG[3]), (IMO MEPC 75/7/15, 2020).

The particulate air pollution is classified by the diameter of the particles, which may vary from tenths of a micron to tens of microns. Particles smaller than 10 microns in diameter are called PM10. There is another classification of PM1 for finer particles less than 1 micron in diameter. Black carbon belongs in this category. The smaller

2 Marine Diesel Oil – MDO

3 Liquefied Natural Gas – LNG

the diameter of the particles, the deeper they penetrate the respiratory tracts. The black carbon particles are very fine particles, sometimes even having a diameter of 0.1 microns. They are able to penetrate into the lungs and into the bloodstream.

Black carbon and its effects on climate, agriculture, and health

Black Carbon (BC) is a carbonaceous substance consisting of particles less than 1 micron (PM1) in diameter. It is produced during incomplete combustion of carbon-based fossil fuels. In scientific literature, the definition of black carbon differentiates it from other forms of carbon due to its unique physiological properties: 1) it strongly absorbs visible light; 2) it is refractory; 3) it is insoluble in water or in organic solvents; 4) it exists in the air as an aerosol (aggregates of small carbon spherules), (Bond et al., 2013). Black carbon has been declared by the United Nations World Health Organization to be carcinogenic.

In the western world, Diesel engines are the main source of particulate emissions. Diesel engines have a relatively high proportion of particulate emission per unit of energy, and the black carbon component in these emissions is high. An estimate of the total global emissions of black carbon for 2013 totaled 7,500,000 tons (Bond et al., 2013). On a global scale, the transport sector is responsible for 19% of all black carbon emissions, mostly (90%) from diesel engines. The share of shipping sector in diesel engine emissions is 3.9% to 5.7%. It is estimated that the annual emissions of black carbon from the shipping sector is approximately 130,000 tons per year (Eyring et al., 2010). Both the IMO and the researchers agree that black carbon emissions from ships are being underestimated. It is estimated that black carbon emissions from shipping will continue to increase and will even triple by 2050 compared with 2004, despite the low-sulfur fuel regulations (Corbett et al., 2010).

The effects of black carbon on climate

Black carbon exists in the atmosphere as particles. It is the main component in soot. Although it is not a greenhouse gas (GHG), it still has an impact on the Earth's radiation balance: black carbon particles have a warming effect due to its property to absorb solar radiation. In addition, when it deposited on snow, it darkens it and alters the melting patterns due to a reduction of the "albedo effect", which is the reflectivity of solar radiation (white surfaces have a high albedo effect). Black carbon also affects the creation of clouds and atmospheric stability in the high strata (Hansen & Nazarenko, 2004). The global warming potential (GWP) of 1 ton black carbon over a period of 100 years is 900 (the range is between 120 and 1800 due to uncertainty over the effect on climate) (Bond et al., 2013). In other words, in order

to achieve the same effect as 1 ton of black carbon on global warming for a period of 100 years, 900 tons of carbon dioxide are required. The global warming potential of 1 ton of black carbon over a period of 20 years is much higher, 3,200 (3,200 times more than CO_2). (Figure 2)

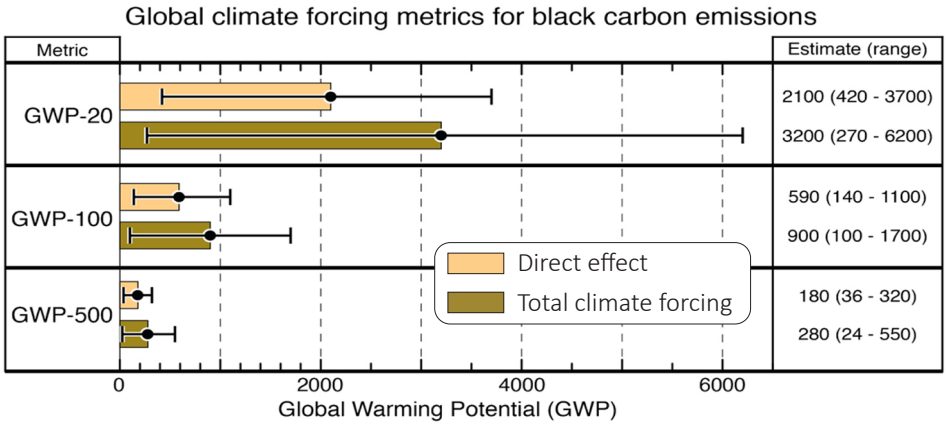


Figure 2: The potential global warming contribution of black carbon, Source: Bond et al., 2013

A recent study done by the International Maritime Organization on greenhouse gas emissions from ships, found that the total greenhouse gas emissions of the shipping sector in terms of ton of CO_2 Equivalent, (meaning the impact of a specific pollutant relative to the impact of 1 ton of carbon dioxide), totaled 1076 million tons in 2018, reflecting an increase of 9.6% compared with 2012. The shipping sector's share of the total global emissions from anthropogenic sources increased from 2.76% to 2.89%.

The main contributor in terms of climate-affecting emissions from the shipping sector is carbon dioxide – 91% of the total emissions, and the second in its effect is black carbon, which amounts to 6.8% of the emissions. Black Carbon emissions from shipping increased by 12% between 2012-2018 (IMO MEPC 75/7/15, 2020). Therefore, black carbon is regarded as the second contributor to global warming, after carbon dioxide, from the shipping sector.

Recently, climate scientists have begun focusing research not only on greenhouse gases but also on aerosol particles (solid or liquid particles suspended in the air), and in particular black carbon, as one of the anthropogenic sources of global warming. Understanding the full range of impacts of black carbon on global warming is still a work in progress, however as opposed to carbon dioxide, which remains in the atmosphere for hundreds of years, black carbon has a relatively short life span in the

atmosphere – between days and weeks. Therefore, black carbon is considered to be an SLCF (short lived climate forcer). This means that the measures for reducing black carbon emissions could have an immediate contribution towards reducing global warming (UNEP & WMO UNEP/GC/26/INF/209, 2011).

The effects of black carbon on health

Black carbon is a particulate air pollutant, meaning air pollution which is caused by microscopic particles of a fluid or solid (as opposed to gaseous air pollution). Particulate air pollution severely affects health since the smaller the diameter of the particles, the deeper they penetrate the respiratory tracts, damaging the lung tissue, degrading respiratory function and increased morbidity of cardiopulmonary disease and cancer. The World Health Organization has defined particulate matter pollution of PM2.5 as being the environmental factor which poses the greatest health hazard (WHO, 2012). Black carbon is one of the components of particulate pollution and it is a universal indicator of the amount of harmful particles from combustion sources. There is scientific evidence of the negative health impacts of the carbonaceous component of the particles. It has been found that black carbon is a better indicator than PM for measuring the negative health impacts of respiratory particles. (Schaap & Denier van der Gon, 2007). Studies show that black carbon has negative health impacts compared with other PM2.5 components (Smith et al., 2009). To date there are not enough toxicological or epidemiological studies able to quantitatively estimate the difference between the health impacts of particles in general and those of black carbon. It is estimated that particulate emissions cause approximately 60,000 premature deaths per year as a result of cardiopulmonary diseases and cancer (Eyring et al., 2010). The average risk of premature death from cardiac diseases is 0.6% per 10 microgram exposure to black carbon (COMEAP, 2006).

To conclude, black carbon is the second most important cause of global warming from the shipping sector, and in terms of warming potential, it causes thousands of times greater warming than a ton of CO_2. Black carbon also has negative health impacts. It is the main harmful component in particulate air pollution and is a cause of illness and death. In addition, black carbon is the main climatic pollutant, harming agricultural crops. Therefore, decision-makers need to address black carbon emissions.

International regulation on black carbon

Until recently, black carbon has not been addressed separately in international conventions or regional agreements, neither were its emissions measured separately.

Instead, it was included generally under particulate air pollution. Following the growing interest over the health impacts of black carbon as a particulate air pollutant, as well as a climate factor, black carbon has begun to receive specific reference as an air pollutant in several frameworks. At the moment, this is evident only in recommendations and there are no regulations yet which specifically reduce or limit black carbon emissions. The International Maritime Organization has been holding discussions on this issue for several years as part of the Marine Environment Protection Committee. It is worth noting that black carbon emissions were addressed for the first time in a study conducted by the International Maritime Organization to estimate the greenhouse gas emissions from international shipping for 2020, due to recognition of its impacts. Following is a review of the current references to black carbon in some international conventions and agreements:

The Gutenberg Protocol was amended in 2012 so that countries' commitments to emissions reduction will also include black carbon. This protocol is part of the UNECE CLRTAP – Convention on LongRange Transboundary Air Pollution. This means the setting of a new standard in the international policy on air pollution, which for the first time includes reference to black carbon. Once the protocol came into effect, the parties to the convention were required to report their national inventory of black carbon emissions. Although the Protocol includes a recommendation to countries to take measures to reduce black carbon emissions, there is no actual commitment to reduce emissions. The United States and the European Union countries are also signatories to this convention.

Annex VI to MARPOL 73/78 Regulations for the Prevention of Air Pollution from Ships, 1997, deals with reduction of air emissions from ships and includes reference to SO_X and NO_X emissions. The annex to the convention does not refer to the required reduction of particulates at all or to black carbon specifically. Limiting the sulfur content in fuels reduces sulfur particulate emissions.

In 2011, the Arctic Council (an intergovernmental forum of the countries bordering the Arctic: Canada, Denmark, Finland, Iceland, Sweden, Norway, Russia and the United States) recommended that member states implement measures to reduce emissions of black carbon. The recommendations include reference to several sectors, which emit black carbon, including the shipping sector. These are voluntary technical measures to reduce emissions from shipping in the Arctic region.

Following numerous position papers that were submitted to the International Maritime Organization regarding black carbon emissions from shipping, and the growing concern with the effects of black carbon on the Arctic region, in November

2020 the Marine Environment Protection Committee approved an amendment to the MARPOL Convention. The amendment prohibits the use and carriage of Heavy Fuel Oil in ships sailing in the Arctic region. Heavy Fuel Oil is regarded to be an environmental hazard both in terms of a potential oil spill and in terms of the emissions of air pollutants, including black carbon, which is also one of the causes of global warming and melting of snow and ice. The prohibition is expected to come into effect in 2024, however it includes many exemptions, which enable certain types of ships to use Heavy Fuel Oil until 2029. This is a first step towards limiting black carbon emissions from ships and reducing its environmental impacts in sensitive regions like the Arctic.

Working groups were formed within the Environment Committee of the International Maritime Organization to identify possible reduction measures for black carbon. It will take a few years (if ever) before an operational regulatory decision is reached on emissions of black carbon.

As discussed, the shipping sector uses large diesel engines, which emit many pollutants, including black carbon. To better understand the emissions from the shipping sector, we shall review which features of a ship influence these emissions.

Ship characteristics which influence black carbon emissions

The ship emissions of black carbon particles are influenced both by the type of engine and the engine load (as a function of the ship's activity) and by the type of fuel being used. Black carbon emission levels are by the following factors:

1. The type of engine installed on the ship: slow speed diesel (SSD), medium speed diesel (MSD), high speed diesel (HSD). 2-stroke engine or 4-stroke engine.
2. The specific engine load as a function of ship activity. The engine load is affected by the cargo and the weather conditions (winds and currents).
3. The vessel type – container ships, bulk carriers, tankers, cruise ships etc.
4. The type of fuel used on the ship – Heavy Fuel Oil (HFO), marine diesel oil (MDO) or liquefied natural gas (LNG).
5. Source of the emissions – main engine/auxiliary engine/boiler.

An overall calculation of the total black carbon emissions of the global fleet by type of ship (figure 4) shows that the container ship category accounts for 26% of the total emissions, the bulk carriers account for 18.6% of the total emissions, the oil tanker category accounts for 15% of the total emissions and the cruise ships account for 6.1% of the total emissions.

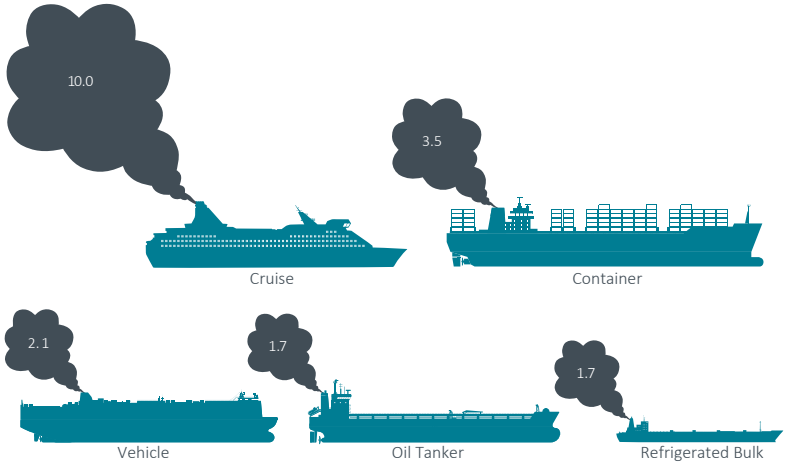


Figure 3: "Emission intensity" of black carbon (tons) per ship per year. Source: ICCT, 2017. Cruise ship, container ship, vehicle ship, oil tanker, refrigerated bulk

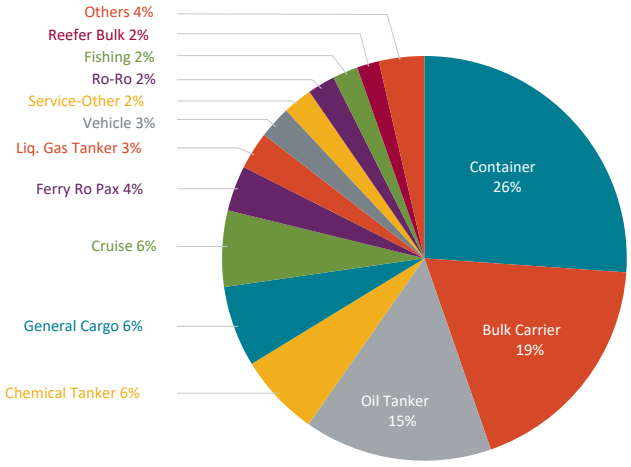


Figure 4: Share of black carbon emissions by ship type. Source: ICCT, 2017

Cruise ships are responsible for 6% of black carbon emissions (the relative contribution of cruise ships to the total emissions is disproportionate to their part of the global fleet as they account for only 1% of all the ships in the global fleet). It is estimated that a cruise ship emits on average 0.34 kg black carbon per ton of fuel it consumes while container ships and tankers emit on average 0.26 kg black carbon per ton of fuel consumed. When looking at the "emission intensity", which is calculated as the total amount of black carbon one ship emits per year, it was found that a cruise ship emits the most black carbon per year – 10 tons black carbon per ship per year, three

times as much as a container ship, which emits 3.5 tons of black carbon per ship per year. In comparison, one cruise ship emits a quantity of black carbon in one year equals to 4,200 trucks under the Euro 5 standard, which travel 100,000 km per year.

The explanation is that a cruise ship consumes large quantities of energy to provide its electricity needs since it is a "floating hotel" serving thousands of passengers that need electricity to operate electricity systems, such as air conditioning in the rooms etc.

Emissions while in port

A ship's activity can be divided into four main operational stages:

1. Cruising between ports, usually on the high seas
2. Maneuvering – entering/departing from port
3. Berthing/Hoteling at port to load or unload
4. Anchorage outside port, usually while waiting before entering the port

As figure 5 shows, ships spend on average half of the time in non-cruising operational modes, i.e., maneuvering, anchorage or berthing – these stages take place in or near the port area.

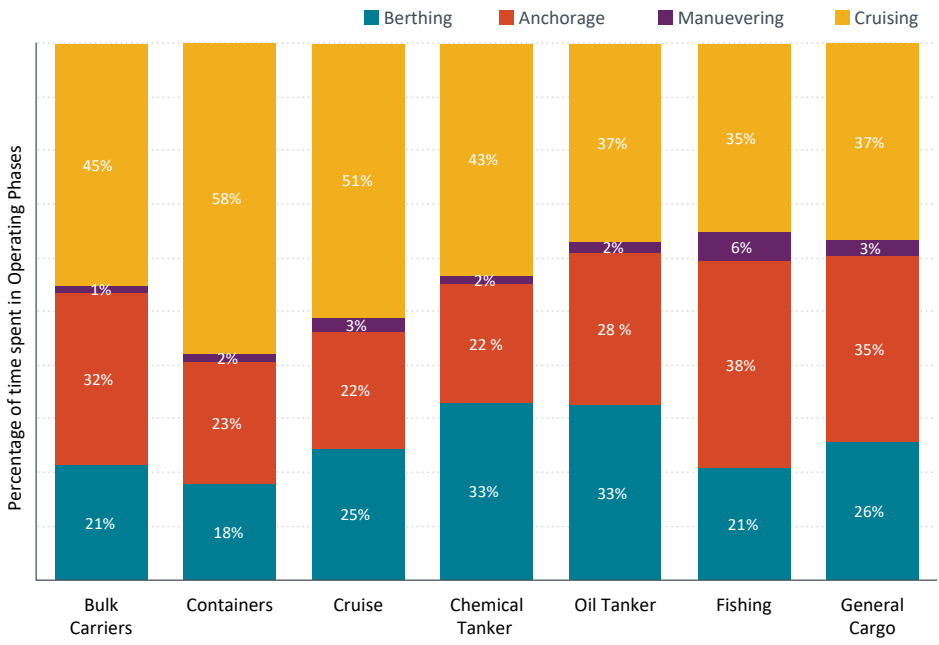


Figure 5: Dwell time in each operational mode by ship type Source: 2020 GHG STUDY IMO

Most commonly, ship emissions are measured during their cruise mode, where most of the fuel consumption takes place and, therefore, also a large proportion of the emissions. At the same time, the emissions which occur in the other operational modes – while in or near the port, are worth examination due to their potential impact on the port surroundings.

In the context of its health impacts on the population near the port, the most significant operational mode, is the Berthing/Hoteling stage due to air emissions from ships therefore it is very important to understand the emissions profile throughout this stage. First, for most of the ship's dwell time in the port (except during maneuvering), the main engine is turned off and therefore emissions are mainly from the auxiliary engine and the boiler. Although the share of emissions from the auxiliary engines while berthing is between 2% and 6% of the total ship emissions, when looking regionally and locally at the port area, studies have shown that emissions from the auxiliary engines while berthing in port account for 40% of the total particulate emissions in port (Xiao et al., 2018).

We shall describe the nature of the emissions according to emission source (type of engine) in each of the ship's operational modes:

Cruising – the ship mainly uses its main engine at cruise speed. In this mode, the engine, the auxiliary engine and the boiler are at optimal operating load and there are less emissions.

Maneuvering – when the ship approaches port, it slows and the main engine operates at low load, the auxiliary engines run at maximum load to provide the electricity needs for the ship's systems. The boiler, too, starts running. The fuel consumption in this mode is highest for the auxiliary engine and low for the main engine and the boiler. Studies show that due to non-optimal load on the engines, the maneuvering mode can create 3 to 6 times as much pollution compared to cruise mode or hoteling mode.

Berthing and anchorage – while the ship is berthing in port to load or unload and also while the ship is at anchorage outside port waiting to enter the port, the main engines are turned off, the auxiliary engine and the boiler continue running to deliver electricity to the refrigerators, lighting, pumps, air conditioning etc., and for heating the fuel. In general cargo ships and tankers, which are required to run the ship's own installations and pumps when unloading, the auxiliary engine runs at high load and so does the boiler, if steam is used for the pumps. The fuel consumption in this mode is medium to high for the auxiliary engine and medium to high for the boiler.

Depending on the type of ship, while on anchorage the ship uses 30% to 50% of the energy used while cruising (Gobbi et al., 2020; Tzannatos, 2010).

A significant part of the global shipping traffic runs near trade routes and ports. 80% of the emissions of the shipping sector take place at distances of no more than 400 km from shore, therefore shipping traffic affects the coastal and port cities air quality (Corbett et al., 1999).

At the local and regional level, the shipping sector has a significant effect on air quality and health near trade routes and ports (Lack et al., 2008). The Mediterranean Sea is considered one of the global hot spots in terms of pollution from shipping due to the large volume of ship traffic. Therefore, air pollution caused by ships has a considerable impact on air quality in port cities in the Mediterranean (Eyring et al., 2010).

A study done in the Port of Barcelona (Pérez et al., 2016) found that the port activity contributes to 50–55% of the particulate emissions in the city. The fuel combustion-related emissions were higher in the port compared to the rest of the city (2.9 nanograms per cubic meter compared with 1 nanogram per cubic meter). Another study estimated that between 10% and 30% of the PM2.5 particulate emissions in Mediterranean port cities are originated from the shipping sector (Thunis et al., 2018). Ship and vehicle diesel engines in ports make a large contribution to the fine particulate emissions and to high concentrations of black carbon near the ports (Gobbi et al., 2020). Due to the proximity of the city to the port, it is expected that the maneuvering, loading/unloading and berthing activities of ships in the port will contribute to air pollution in the nearby city (Castells Sanabra et al., 2014).

The most relevant emissions to the area near the port are particulate emissions and SO_x emissions due to the harm these may cause while in their original form (meaning as a primary pollutant). The health impacts caused by these emissions are dependent on the proximity of the emission source and the receptor. For this reason, the population density around the emission source is critical (Castells Sanabra et al., 2014).

A report published by the Air Resources Board in California's Environmental Protection Agency (Air Resources Board, 2005) on the health impacts of emissions from ships' auxiliary engines at berth, found that communities near ports are exposed to elevated risks of cancer and other health impacts from diesel engines particulate emissions (Diesel PM) from ships at berth. An estimate made specifically for the ports of Los Angeles and Long Beach found that 20% of the total particulate

emissions from diesel engines originated from ships in the port (Hoteling emissions). In addition, when comparing the health impacts of the various types of activities near the port, which emit diesel particles, it was found that the impact of hoteling ships is the most significant in terms of the area impacted and in terms of the health risk to the population. The estimation of health risk to the population near the port is that 34% of the risk (61 deaths per year) is attributed to emissions caused by the activities of hoteling ships, compared with other activities in the port which emit diesel particles, such as emissions from ships while maneuvering in port or while cruising near the port, emissions from cargo handling equipment in the port and from the activities of trucks and trains in the port.

In view of the abovementioned findings, it appears that emissions from ships while hoteling in port have considerable effect on the air quality in the area surrounding the port. Therefore, a specific study on ship emissions during their operational mode while in port can be valuable. Another important aspect is that emissions from ships are not distributed evenly throughout the country. Rather, they are concentrated in port cities – and in Israel's case these are Haifa and Ashdod. Therefore ship-generated air pollution is of greater impact in the port cities.

Air pollution from ships in Israel

The Ministry of Environmental Protection conducts an "air emission inventory" which estimates all emissions sources that emit pollutants into the air. The air emission inventory is calculated for sectors that are significant sources of emissions. One of these is the transport sector. The methodology for preparing an emission inventory (Ministry of Environmental Protection, 2019) is based on the Pollutant Emission Inventory Guidebook, published by the European Environmental Protection Agency (EEA, 2020).

From Israel's air pollutant emission inventory of 2018, update 2020 we can examine the relative contribution of the shipping sector to the total air pollutant emission inventory in Israel. Table 1 details the share of vessels related emissions out of the total air pollutant emission inventory in Israel. Vessels in ports are responsible for 16% of the total air emissions of SO_x, and 8% of NO_x. For PM2.5, the shipping sector is responsible for 7% of all the emissions in Israel. It is important to note that in Israel there is no specific estimate for emissions of black carbon.

Table 1: Share of vessels out of the total air pollutant emission inventory in Israel

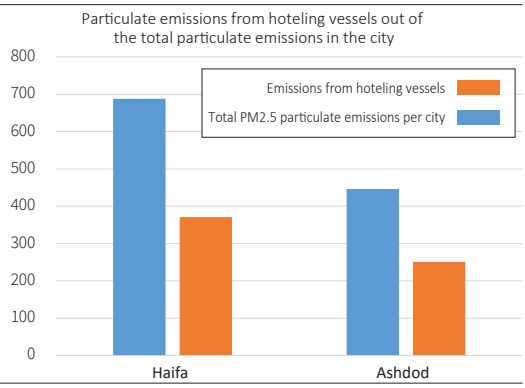
Air pollutant emission inventory	NO_x	SO_x	CO	Particulate matter, diameter less than 10 microns	Particulate matter, diameter less than 2.5 microns	Volatile organic compounds excluding Methane
Emissions from vessels (tons per year)	9,093	7,871	1,240	779	779	604
% of emissions from ships out of the total emissions of this pollutant	8%	16%	1%	5%	7%	2%

Source: air pollutant emission inventory 2018 update September 2020, the Ministry of Environmental Protection

The Ministry of Environmental Protection's emission inventory is detailed by cities in which the emission sources are located. To better understand the local effect of emissions from vessels in ports, the total emissions for the port cities of Haifa and Ashdod were examined, and the relative share of the emissions from vessels were calculated out of the total emissions in the city. As table 2 shows, particulate emissions PM2.5 in Haifa totaled 688 tons, of which 371 tons are attributed to emissions from vessels (54%). In Ashdod particulate emissions PM2.5 totaled 446 tons, of which 251 tons are attributed to emissions from vessels (56%).

Table 2: The relative contribution of vessels to the total emissions of PM2.5 particulate emissions in the port cities of Haifa and Ashdod

	Haifa	Ashdod
Total PM2.5 particulate emissions per city (tons)	688	446
Emissions from hoteling vessels (tons)	371	251
% contribution of vessels to the total PM2.5 particulate emissions per city	54%	56%



Source: air pollutant emission inventory 2018 update September 2020, the Ministry of Environmental Protection

From the above data it can be concluded that in Israel's port cities, emissions from vessels have an extremely significant contribution to air pollution – over half of the PM2.5 particulate emissions are attributed to vessel emissions.

In a study conducted in Israel for the Ministry of Environmental Protection (Barak et al., 2018), the extent of air pollution from vessels in the ports of Haifa and Ashdod was estimated. The study found that the air pollution generated by the vessels in the Haifa and Ashdod ports amounts to heavy pollution, similar in magnitude to

a large, diesel-powered power station. This study found that the majority of air pollution from ships in ports is caused from the hoteling stage due to the electricity consumption from the auxiliary engines. The study did not examine black carbon emissions. Only PM2.5 particulate emissions were measured and it was found that the hoteling stage in a terminal is responsible for 48–59% of the PM2.5 emissions, the maneuvering and waiting stage is responsible for 27 to 34% of these emissions, and the cruise stage is responsible for 14–18% of the emissions. This means that approximately 80% of the emissions take place within the port area (anchorage, maneuvering and waiting at distances of up to 10 km from port).

Measures for Reducing Black Carbon Emissions from Ships

In view of the negative impacts of black carbon on health and climate, as reviewed in this article, and the specific effect of ship emissions on air quality in port cities, it is necessary to address appropriate measures to reduce black carbon emissions from ships in general and in particular while ships are hoteling in ports.

There are several possible measures for reducing black carbon emissions. These include measures which will be taken on the ship and measures which will be taken on the shore or at the port. Following is a review of the possible measures for reducing black carbon emissions from ships:

Possible reduction measures on ship

Reduction measures on the ship can be divided into several categories: changes in types of fuels used or treatment of fuels, changes in the engine systems or in the ship structure and treatment of exhaust gases:

1. Fuel type – changing the fuel type used by the ships, using a less-polluting fuel such as distillate fuels, liquid natural gas (LNG), biodiesel and methanol, or treating the fuel.
2. Structure and engine systems – adaptation of the ship structure and engine systems to improve the efficiency of the fuel consumption, and operational means, such as Slow Steaming.
3. Treatment of exhaust gases – the gases emitted from the ship funnel can be treated by installing scrubbers, diesel particulate filters (DPF) (combined with low-sulfur and low-ash distillates) or by installing an electrostatic precipitator.

Possible reduction measures on shore or at port

In addition to the reduction measures above operated on the ship, there are additional measures which can be taken on the shore or at the port, and which are relevant to the reduction of emissions while the ship is hoteling in the port:

Possible emission reduction measures during the ship's hoteling in port include connecting the ship to an electricity power supply from the shore (Electric Shore Power) while docked in port, and on-shore capture & control systems which connects to the ship funnel to treat the ships exhaust emissions. In addition, it is possible to take regulatory measures at the regional level, for example prohibition on the use of Heavy Fuel Oil, and declaration of Emission Control Areas – ECA.

In addition, some voluntary practices on the part of the ports themselves are also possible. For example, reducing port fees for ships using clean fuels while hoteling (Hong Kong) as well as improving the operational interfaces between the ship and the port, such as optimization of JIT ship calls and reducing the ship's hoteling time in the port or on anchorage.

Recommendations for reducing emissions in Israeli Ports

In view of the health risks posed to the population living close to ports and shipping lanes due to emissions of black carbon from ships berthing in the ports or sailing nearby them, measures should be taken to reduce emissions from ships. The most efficient reduction measure which is aimed to reduce emissions from ships during the hoteling stage in the port, and which effectively reduces all types of emissions from ships, is to connect them to electric shore power. This measure can be aimed to the most polluting types of ships, for example cruise ships and container ships. As for bulk carriers, which have high emission rates due to their long hoteling time, other measures can be used to reduce emissions, such as connecting to a capture & control system. In addition, ports can take some operational measures to accelerate and improve the efficiency of unloading operations in order to reduce ships' hoteling time in port.

Regarding reduction measures which are operated on the ship – although the International Maritime Organization has been discussing the issue of black carbon emissions reduction from ships, there are no regulations in place. Some ships have already installed exhaust gas scrubber (EGS) systems to reduce emissions of sulfur particles. While this is a less efficient option in terms of reducing black carbon emissions, it is technologically available and is already in use on ships. A more

efficient option for reducing black carbon emissions is a Diesel particulate filter (DPF), however it is not currently in commercial use on ships.

The type of fuels used by ships are also very relevant to emissions: Academic literature data indicates that the heavy fuel oil is four times as polluting than distillate fuels. Therefore, switching ships to using less polluting fuels is of extreme importance for emissions reduction. Switching to using LNG as a fuel is one of the most promising possibilities both in terms of the potential reduction in particulate emissions and in terms of technological availability, although currently there are very few such ships. Regarding alternative fuels such as biodiesel, methanol and ammonia – at this stage the technology has not sufficiently matured for commercial application in ships. The fuels are not available in the necessary quantities required nor does the coastal infrastructures required.

As part of the regulatory measures the State of Israel can take to reduce emissions, it is highly important that the Mediterranean Sea be designated an Emissions Control Area (ECA), which would enable imposition of more stringent restrictions on the fuels in use in the Mediterranean area in general and in Israel in particular. Thus, it is necessary to accelerate Israel's joining MARPOL Convention's Annex VI.

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Section 5: Maritime law, good order at sea

This section contains a variety of articles that discuss different aspects of good order at sea. One article discusses Israel's decision no to sign the United Nations Convention on the Law of the Sea (UNCLOS) in 1982 and examines the reasons given then in comparison to the current state of affairs. Another article examines the question of the maritime border between Israel and the Gaza Strip from economic and legal perspectives. Another article suggests a maritime monitoring system for Israel that will allow collecting data on activities and occurrences in Israel's maritime domain, for security and inspection. The fourth article discusses the defense of Israel's ports against cyber attacks and explains that the investment in security measures is worthwhile compared to the expected damage of a cyber attack on the ports. The fifth article discusses the impact of government subsidies on the maritime sector around the world. The sixth article discusses the benefits offered by flag of convenience countries and how other countries cope with these benefits. The final article examines the reform in the Israeli ports since the Israel Ports Company was established and replaced the Ports Authority.

The State of Israel and the Convention on the Law of the Sea – the Current State

Benny Spanier

Introduction

For over a decade now, various events in the marine domain in our region, not necessarily related one to another, repeatedly focus our attention on this arena. A partial list would include these, for example: The discovery of gas deposits in Israel's Exclusive Economic Zone and the question of their development; the delimitation of the maritime border between Israel and Lebanon; the tension with Turkey over the "blockade" of Gaza and the question of maritime zones with Libya; the joint gas pipeline from the Eastern Mediterranean to Europe; the pollution of Israel's shores with tar, etc. In this context, the question of Israel's status and its rights from the perspective of the Law of the Sea is raised.

A closed seminar was held on March 8, 2021, at the Maritime Policy & Strategy Research Center, attended by experts and policymakers in Israel on the question of: Pros and Cons of Israel's Joining the Convention on the Law of the Sea.[1] In view of what was said there, this article seeks to present the main insights on the issue of Israel's non-signature of the Convention on the Law of the Sea in 1982, and to examine whether, and to what extent, the political and economic developments within the international and regional system this past decade justify revisiting the pros and cons of Israel's joining the Convention.

First, we will present the background of the signing of the Convention on the Law of the Sea in 1982. We shall then present the main reasons why Israel did not join the Convention: (1) The status that was given to the PLO and the fear of the appearance of recognition of the PLO had Israel signed it; (2) The diminished rights of passage in the Straits of Tiran; (3) Restriction of military vessels' ability to conduct searches on the high seas; (4) Obligation to submit to international arbitration in case of an unresolved maritime dispute; (5) The USA's non-signing of the Convention. For each one of these reasons, I shall present the current status. In the article's conclusion I shall present several forward-looking recommendations, to the extent that they

[1] The seminar was held under the Chatham House Rule, i.e., the names of the participants and their affiliations cannot be made public, however anything said there can be used. This paper constitutes its author's interpretation of what was said in the seminar. Any error or misunderstanding are his sole responsibility.

relate to the continued debate on Israel's position regarding its signing up to the Convention.

The main argument of the paper is that it is worth evaluating the prevailing claim that Israel has no reason to join the Convention on the Law of the Sea at the present time, since it enjoys all its rights due to the very fact that it accepts the Convention as customary international law and on the other hand it is not subjected to its inherent pitfalls. The changes in the Eastern Mediterranean and Israel's current status allow it to take an initiative which will enable it to deal successfully with challenges in the maritime domain, while not necessarily taking risks. Under these circumstances the Convention on the Law of the Sea can serve as a lever, rather than a hinderance, which Israel can use to advance its objectives.

The Background for the Creation of the Convention on the Law of the Sea

International conventions are the main legislative tool of international law. They are the main means for creating norms, commitments and institutions.[2] The normative basis empowering the conventions, and which motivates countries to join them is the fundamental customary rule according to which agreements have to be honored (Pacta sunt servanda). Thus countries, including Israel, create a contract which reflects the convergence of their interests, and in which they assume upon themselves legal duties and acquire entitlements for themselves, which create mechanisms enabling cooperation between them. In today's era of global international law, this tool institutes a political discourse of rights and duties. It reflects both on domestic law within countries and on the interrelationships between them.[3]

The overriding goal of the Convention on the Law of the Sea is to regulate geographically, peacefully, and fairly, the use and exploitation of the world's largest and most important natural resource.[4] The laws of the sea were among the first to develop as customary international law and among the first to begin to take form through codification.[5] In this sense, this is a European process, since Europe was the leader concerning the ability to use the high seas through large ships and

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2 See: Orna Ben-Naftali and Yuval Shany *International Law between War and Peace* 367–373 (2006) [Hebrew] (hereinafter: Ben-Naftali and Shany)

3 See: Ben-Naftali and Shany, ibid, footnote 2, p. 19.

4 See: United Nations Convention on the Law of the Sea, signed 10 December 1982, entered into force 16 November 1994, 1833 UNTS 397 (1982) (hereinafter: Convention on the Law of the Sea).

5 See: Sarah Weiss Maudi, "Laws of the sea," *International Law* 525, 525 (third issue, Robbie Sabel and Yael Ronen editors, 2016 [Hebrew] (hereinafter: Weiss Maudi) [Hebrew]

suitable instrumentation, and it was also Europe that created the realization of the importance of a military naval force.[6] After hundreds of years in which the maritime customs developed, the First United Nations conference on the Law of Sea (UNCLOS I) took place in 1958 in Geneva with 86 countries attending. The conference formed four conventions which, from this point onwards, became the normative basis for the Law of the Sea: the Conventions on the Territorial Sea and Contiguous Zone; the Convention on the High Seas; the Convention on the Continental Shelf, and the Convention on Fishing and Conservation of the Living Resources of the High Seas. There was an intention to create another Convention on the Compulsory Settlement of Disputes arising from the Convention on the Law of the Sea, however this one never reached fruition. Israel signed and ratified the first three conventions and they came into effect in 1961. The last convention was signed but never ratified.[7]

The third conference on the Law of Sea was between 1973 and 1982. It consisted of 11 rounds of talks over 585 days. It took place alternatingly in three countries.[8] Israel was an active participant in all these deliberations. The Convention was opened for signing on December 10 1982 at Montego Bay in Jamaica. The Convention came into force on November 16, 1994 – one year after the sixtieth country ratified it. Until today the Convention has been ratified by 168 countries and organizations.[9] In the eastern Mediterranean region, Lebanon, Egypt and Cyprus have signed and ratified the Convention. Israel, Syria, and Turkey, however, have not. Nevertheless, Israel accepts the customary guidelines of the Convention on the Law of the Sea, including the guidelines regarding the maritime zones.[10]

The reasons Israel did not join the Convention on the Law of the Sea

In the course of the seminar, it became clear that at the basis of Israel's abstention from joining the Convention were several reasons not necessarily related to one another, but which ultimately drove the decision on this issue. Following is a review of the five main reasons for Israel's decision not to sign and their meaning today.

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6 See: Donald R. Rothwell & Tim Stephens, THE INTERNATIONAL LAW OF THE SEA (2016) (hereinafter: Rothwell & Stephens), p. 1.

7 See: Weiss Maudi, footnote 5, p. 526.

8 The second conference on the Law of Sea took place in 1960 and failed to achieve any results. It is not relevant to this article.

9 See: United Nations convention on the law of the sea (table of signatures and ratifications)

10 See: Attorney General, Opinion of the Deputy Attorney General regarding the Law Applicable in Marine Areas, January 15 2013 (clause 37) [Hebrew].

1. The PLO's signing of the Convention

The Ministry of Foreign Affairs documents from 1982 reveal that the most important reason for Israel not to sign the Convention was the fact that a decision was made at the convention, enabling national liberation organizations to join, thereby obtaining observer status in the institutions which would be set up due to the Convention. This effectively paved the way for the PLO to join the Convention and Israel was keen to prevent the appearance that by its signing the Convention it was granting recognition to the organization and accepting its membership.[11] The documents reveal division of opinions among the professionals, but ultimately – and considering that this took place while the First Lebanon War was being fought – the decision was made not to sign.

The situation today: In 1993, Israel and the PLO signed the Oslo Accords, in which Israel recognized the latter as the legal, legitimate representative of the Palestinian people, and the Palestinian Authority was established. Various subsequent agreements were signed with the Authority. In other words, the current situation is that the reason which validated the 1982 decision has become meaningless. Moreover, in September 2019 the Palestinian Authority deposited its declaration regarding its maritime zones offshore Gaza at the UN, in accordance with the Convention on the Law of the Sea.[12] This means that the Palestinian Authority is using the Convention for political and economic advancement of issues it regards as important. At the same time, Israel is not a party to the Convention and is not taking any measures whatsoever in the maritime domain, which relate to consolidating its hold on that domain, at least not in any way related to the Law of the Sea.

2. Navigation through the Straits of Tiran

The 1958 Convention on the Territorial Sea and Contiguous Zone states that navigation in the straits would be open to all for "Innocent Passage".[13] However, in practice the

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11 See for example: Lydia Shukrun, Manager of the Department of Israeli Law and Law of the Sea, to Alon, August 15, 1982, Subject: Law of the Sea, Straits of Gibraltar, Israel State Archive, File MFA-5873/10 [Hebrew]; and Shabtai Rosen to Rubinstein, November 3, 1982, Subject: Law of the Sea – the Final Draft, Israel State Archive, File MFA-5873/12 [Hebrew].

12 See: Declaration of the State of Palestine regarding its maritime boundaries in accordance with the United Nations Convention of Law of the Sea. State of Palestine Ministry of Foreign Affairs and Expatriates.

13 See: Convention on the Territorial Sea and Contiguous Zone (1958), Clause 16(4); and also: ICJ-Corfu Channel case, Judgment – (1949). This regime was created and specified de facto in the ruling by the international Court of Justice on the Corfu affair back in 1949.

blocking of the Straits of Tiran by Egypt was one of the main reasons for the outbreak of the Sinai War in 1956 (which preceded the creation of the Convention) and also for the Six-Day War in 1967. And so, the 1979 peace treaty between Israel and Egypt specifies that navigating in the Straits of Tiran would be "freedom of navigation" ("unimpeded and non-suspendable freedom of navigation and overflight"), like on the high seas. In other words, the parties understood the sensitivity of this issue and upgraded the regime as it exists in the Convention from "Innocent Passage" to "Freedom of Navigation".[14]

Three years later, in 1982, the Convention on the Law of the Sea downgraded the right of passage through the Straits of Tiran from the outset it specified a new regime in the straits, named Transit Passage, which allows for passage without an option to remain, when the strait connects between high seas or an Exclusive Economic Zone and other high seas or another Exclusive Economic Zone.[15] The problem was that the Straits of Tiran do not fit this definition. They connect between high seas (the Red Sea) and territorial waters of other countries (Saudi Arabia and Egypt, in the Gulf of Eilat), and therefore it is not possible to benefit from the rights to "Transit Passage", and rather, one must make do with an "Innocent Passage" regime, which is prevalent in straits of this kind.[16] According to the Convention on the Law of the Sea, "Innocent Passage" can be suspended for various reasons (technical or safety).[17] Various documents of that time indicate that the reason for Israel's objection to the Convention on the Law of the Sea was the downgrading of the level of passage regime in the Straits of Tiran.[18] The concern was of the possibility of suspension and control over all passes through the strait en route to or from Israel. This was in view of the bitter experiences of 1956 and 1967 and, in practical terms, that the straits might once again be blocked to navigation.

The situation today: In the peace treaty with Egypt, whose signing had preceded the Convention, the navigation regime in the straits was settled and was upgraded to "Freedom of Navigation". There is broad agreement among scholars that the peace agreement takes precedence over the Convention, being a preceding and specific

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14 See: Peace Treaty Between the State of Israel and the Arab Republic of Egypt of March 26, 1979, in clause 5(2).

15 See: Convention on the Law of the Sea, footnote 4, in clauses 37–44.

16 See: Convention on the Law of the Sea, footnote 4, in clause 45(1)(b).

17 See: Convention on the Law of the Sea, footnote 4, in clause 19(2).

18 See for example: By: Arieh Rona, Manager, Administration of Shipping and Ports, to Minister of Transportation, Mr. Yisrael Kessar, on January 2, 1996, Subject: State of Israel's joining the Convention on the Law of the Sea, Israel State Archives, file GL-40248/23.

agreement. However, in 2016 Egypt and Saudi Arabia signed an agreement in which, inter alia, the islands of Tiran and Sanafir were returned to the sovereignty of the latter, effectively conceding half of the Straits of Tiran along with it. Saudi Arabia (currently) recognizes neither Israel nor the peace treaty signed between Israel and Egypt. Neither does it accept (at least not officially) the change in the navigation regime in the straits. Therefore, as far as Israel is concerned, there is a concern today that following the agreement between Egypt and Saudi Arabia, and in view of the Convention on the Law of the Sea, it would be possible once again to block at least half of the passage through the straits.[19] It is likely that the solution for this issue lies in a negotiated settlement between all the parties, not necessarily in accordance with the Convention on the Law of the Sea.

3. Prohibition on searching ships on the high seas

Another reason for Israel's non-signature to the Convention on the Law of the Sea was potential exposure to prosecution in international forums due to military activities on the high seas. The Convention allows for "visits" by navy vessels to civilian ships on the high seas, however not under the authority of an organized multinational force, only if these are suspected of piracy, slave trade, illegal broadcasting or questions of nationality or flag.[20] The Convention does not recognize anti-terrorism as grounds for enforcement by means of warships on the High Seas – a practice Israel has engaged in over many years of its war against terror.

The situation today: The past decade is characterized, from the security perspective, as a time of a low intensity conflict. This type of warfare is characterized by "under the radar" activities, with a high degree of deniability. In addition, it is clear that a large proportion of the activity during this period is done via proxies. It is possible that the terrorist activity that characterized the preceding decades (for example the attempt to smuggle weapons in 2002 on board the *Karine A*) is less relevant. Therefore, perhaps, in the current reality, this consideration is less significant. Furthermore, it is possible that the risk in this respect can be hedged by adding an exception clause when signing up to the Convention (see below).

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19 See: Benny Spanier, "The Transfer of the Tiran and Sanafir Islands to Saudi Arabia and Freedom of Navigation in the Straits of Tiran – an Unsolved Story", in Shaul Chorev and Ehud Gonen (eds.), *Maritime Strategic Evaluation for Israel 2017/18* (Haifa: Maritime Policy & Strategy Research Center, University of Haifa, 2018), pp. 147–155.

20 See: Convention on the Law of the Sea, footnote 4, in clause 110; and also: Rothwell & Stephens, footnote 6, pp. 175–176.

4. Mandatory arbitration

Article 9(1) of the Convention on Fishing and Conservation of the Living Resources of the High Seas from 1958 specified, for the first time in maritime law, a mechanism of mandatory arbitration.[21] In case of disagreement between parties, the dispute would be referred to a committee consisting of five members, unless the parties agree on some other proceeding for resolving the dispute. This is almost certainly the reason why Israel never ratified that convention.

Chapter XV of the Convention on the Law of the Sea of 1982 is dedicated to dispute settlement. Clause 279 specifies the duty of the countries to resolve differences through peaceful means.[22] It states that if the parties fail to settle the dispute between themselves, the section in the Convention concerning mandatory arbitration – the second part of Chapter XV – would be enacted.[23] And indeed, clause 287 specifies all of the possible ways for resolving the potential disputes (the various forums) and the countries are invited, when signing on to the Convention, to choose their preferred options. As a rule, the Convention on the Law of the Sea does not permit reservations or abstention from mandatory arbitration, except in two main cases cited in clause 298: in disputes concerning the delimitation of maritime borders (298(1)(a)(I); and disputes on military issues (298(1)(b)).[24]

From what some of the experts in the seminar said, one could deduce that the option of mandatory arbitration within the Convention on the Law of the Sea is the main reason, today, for Israel's not joining the Convention. Israel wants to prevent the possibility of being "dragged" into litigation in front of international forums regarding its activities on the high seas and disputes concerning these activities.

The situation today: Israel's problematic failure in the delimitation of the land border affair regarding Taba in 1988 considerably cemented its conviction against litigation in front of international forums.[25] In terms of the Convention on the Law of the Sea, nowadays, one can list several significant issues which could form grounds for

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21 See: Convention on Fishing and Conservation of the Living Resources of the High Seas (1958), clause 9(1).

22 See: Convention on the Law of the Sea, footnote 4, in clause 279.

23 See: Convention on the Law of the Sea, footnote 4, in clause 281(1).

24 See: Convention on the Law of the Sea, footnote 4, in clause 298; see also: Rothwell & Stephens, footnote 6, pp. 491–494. There is one more case in which a reservation is acceptable, and this concerns Security Council decisions to exercise its authority over the dispute. For more details

25 See: Robbie Sabel "The Attempts to Negotiate a Compromise Solution to the Taba Dispute", *Bar Ilan Law Studies* 14, 507,517–518 (1997) [Hebrew]

mandatory litigation in such forums: the dispute over the maritime border between Israel and Lebanon; the maritime boundary around Gaza with the Palestinian Authority (whenever that time comes); the right of passage in the Straits of Tiran, in particular within the zone controlled by Saudi Arabia; the restrictions on navigation and entry to the Gaza Strip by sea; the cross-border offshore reserves (especially in the Lebanon area) and, as mentioned, the issue of conducting searches on suspicious vessels on the high seas.

There is a measure of scope for dealing with the mandatory arbitration issue. An initial quantitative examination shows that as of today, 41 countries have attached provisos to one of the abovementioned issues or to both of them. This means about 25% of the countries which are party to the Convention, and therefore this is not a negligible occurrence. It means, on the one hand, that an international practice is being installed, whereby countries join a convention but reserve the right to defend their interests in certain aspects. On the other hand, there is a phenomenon by which international forums take upon themselves authorities transcending the letter of the convention, and refuse to accept those provisos. This is the case in the South China Sea – China's claims; and also in the case of the Strait of Kerch between the Sea of Azov and the Black Sea – Russia's claims.

The experts at the seminar drew an ambiguous picture, which can be assessed in various ways. On the one hand, some claimed that there is no reason to join the Convention since Israel accepts it as customary international law, does not benefit from it, and avoids the risk of being "dragged" into international forums. On the other hand, some claimed that joining would enable hedging the existing disputes and would provide Israel with a normative leverage against its adversaries, which would enable it to progress efficiently toward resolving the existing disputes.

5. The United States' abstention from joining the Convention on the Law of the Sea

From reading documents in the Ministry of Foreign Affairs' archive it appears that the United States' decision not to join the Convention, due to its own considerations, also had an influence on the Israeli decision.[26] The opinions in the seminar were divided over how much the United States' position influenced Israel's decision.

The situation today: Joe Biden's entry into the White House in early 2021, the return of the United States to the Paris Accords on Climate Change and other agreements, as well as the general trend of international cooperation, indicate a change in the

[26] See for example: "The Steering Committee for the Interministerial Advisory Committee on the Maritime Issue", 16.6.1982. Israel State Archives, file MFA 5873/10.

United States' approach. It is difficult to predict whether this change will apply also to the Convention on the Law of the Sea and whether the United States will be joining it. On this matter the opinions of the experts at the Seminar were divided and it appears that it is not possible to get a clear, unequivocal picture. At the same time, one can presume that should the United States join the Convention, this will be a significant component in Israel's considerations as to whether to join this move.

Forward-Looking Recommendations

1. It is worth evaluating, through academic research, the claim that at present Israel has no reason to join the Convention on the Law of the Sea, since on the one hand, it enjoys all the rights in the Convention due to the fact that it accepts the Convention as customary law, while on the other hand, it is not subjected to its inherent pitfalls. The study should examine the challenges Israel faces in the maritime arena and, in each one, would weigh the advantages and disadvantages in joining the Convention. Even if it may seem, at one time or another, that the balance is shifting in one direction or the other, the situation in our region and in the international arena is changing and the balance of power needs to be revisited from time to time.
2. The declaration by the Palestinian Authority of the maritime zones in the Gaza region challenges the State of Israel, Egypt and Cyprus. As far as Israel is concerned, the declaration is a challenge to the settling of this area in future negotiations (whenever they occur). Israel ought to push forward its own Maritime Regions Law, in which it will declare its own boundaries, including in this region.
3. Concerning half of the Straits of Tiran, which are under Saudi sovereignty, there is a question as to the navigation regime as it appears in the Convention. This issue will need to be discussed with Saudi Arabia, if and when a dialog will take place between the parties. Experts should prepare the groundwork for this dialog, or for an attempt to resolve the issue through indirect means. Past experience has shown that it is better to reach an early, agreed solution before it is too late.
4. It is advisable to conduct an empirical academic study at the international level that would examine the issue of provisos countries install under clause 298 of the Convention (delimitation of boundaries and military activity). It should ask whether this mechanism does indeed provide countries protection against intervention of international forums in local conflicts and disputes and to what extent this can be relied on. Such a study can confirm or dispel the claim that there are mechanisms within the Convention which provide sufficient protection against mandatory arbitration, thereby influencing Israel's decision on this issue.

5. The proper professional levels should conduct a dialog with the United States on the question of its position toward joining the Convention on the Law of the Sea. This dialog ought to provide clarity as to whether a change in their attitude can be expected regarding joining the Convention, and what would their position be should Israel decide to join without them.

UNCLOS, Delimitation of Maritime Boundaries and Offshore Infrastructure as a Means for Regional Cooperation and Reconstruction of the Gaza Strip

Orin Shefler

The starting point for future negotiations between Israel and the Palestinians regarding the maritime zones offshore the Gaza Strip ("**Gaza**") will no longer be as it was. The acting parties have internalized their lessons-learned from past interactions, and a new race has begun with respect to developing natural resources in the Mediterranean Sea. This race will undoubtably have a significant effect on the outcome of the Israeli-Palestinian conflict. Operation "Guardian of the Walls" was indeed harmful to the Hamas regime in Gaza but it did not bring about its downfall. The protracted political and diplomatic struggle between Israel and the Palestinian leadership, including the dispute over the maritime zones and natural resources deposits therein, has remained unchanged. In this article, I shall introduce a new premise which links between the delimitation of Israel's maritime boundaries in accordance with the United Nations Convention on the Law of the Sea ("**UNCLOS**"), regional cooperation and the resolution of the Israeli-Palestinian conflict and the reconstruction of Gaza. The traditional diplomatic and military process between Israel and the Palestinians has always hidden a complex layer of mutual claims to oil and gas reservoirs in the Mediterranean Sea. The Israeli-Palestinian conflict has begun to stray from the classic security concepts, where the Palestinians are at an inherent disadvantage, and are shifting to other arenas, where the Palestinians have a better chance of achieving their political aspirations with far-reaching economic implications. Perhaps, from within this new reality, new opportunities could allow for a more efficient balance of interests with respect to the exploitation of natural resources in the Mediterranean Sea for the benefit of the State of Israel, Egypt and the Palestinians, under state-sponsorship of stakeholder countries.

The Historical Context of The Maritime Zones Offshore Gaza

Since the declaration of the State of Israel, the question of control over the maritime zones offshore Gaza has been subject to considerable debate – and so far, this matter remains unresolved. Surprisingly, Israel and Egypt decided to abstain from settling this issue as part of the peace treaty between them in 1979. The question of control of the maritime zones offshore Gaza has been devoid of a sustainable solution. In this article, I shall distinguish between two different approaches to achieving a comprehensive regional settlement regarding the maritime zones offshore Gaza: the first doctrine, the "Classic Doctrine" which deals primarily with the question of governance, military and political control over the borders of Gaza and its maritime zones; and the second doctrine – the "Modern Doctrine", which takes a more expansive approach and also deals with the significant economic issues under the principles of UNCLOS, and in particular – the delimitation of the maritime

borders offshore Gaza and ownership of the natural resources therein. These two doctrines require distinctly separate disciplines and expertise. These two doctrines are independent of each other, but also complement each other at certain interface points. To better understand the implications of the Modern Doctrine, one must also understand the depths of the Classic Doctrine (including key events, previous agreements and maritime incidents which have brought the parties to this point).

The Gaza-Jericho Agreement[1]

In May 1994 an agreement was signed between Israel and the Palestine Liberation Organization (PLO) ("**Gaza-Jericho Agreement**") which, among other things, addressed the legal status of the territorial waters offshore Gaza. In the Gaza-Jericho Agreement, Israel agreed that the Palestinian Authority's autonomous authority would include [the] "surface, subsurface and territorial waters" offshore Gaza, whereas Israel would bear responsibility for the "protection against external threats, including the responsibility for protecting the Egyptian Border and the Jordanian line, and for protection against external threats from the sea and from the air". The use of such terms was apparently not incidental since these terms also appear in Israeli legislation[2] and have a clear and distinct meaning. Under the Gaza-Jericho Agreement, it was also agreed that several maritime zones would be established offshore Gaza: the first, a maritime zone referred to as the "Central Zone" which would extend up to a distance of approximately 20 miles off the coast of Gaza into the sea; and the second, two strips of water, a mile and a half each, in the southern section near Egypt and in the northern section near Israel. These areas were to remain under Israeli security control.

Under the Gaza-Jericho Agreement, the Central Zone was intended to be governed under joint Israeli-Palestinian control and used for fishing and other domestic use. The Central Zone was measured from the Gaza coastline and up to the twentieth mile offshore. From the Gaza coastline and up until the third mile offshore was to be used for tourism and recreation. Foreign shipping was barred from approaching the Gaza coast up to 20 miles until the construction of a seaport in Gaza.[3]

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1 The "Gaza-Jericho Agreement between Israel and the PLO", May 1994.

2 The Submarine Areas Law, 1953, Section (1) A "the territory of the State of Israel shall include the sea floor and underground of the submarine areas adjacent to the shores of Israel that are outside Israel territorial waters, to the extent that the depth of the superjacent water permits the exploitation of the natural resource situated in such areas".

3 "Report of the international fact-finding mission to investigate violations of international law, including international humanitarian and human rights law, resulting from the Israeli attacks on the flotilla of ships carrying humanitarian assistance", p. 6.

The map below illustrates the Classic Doctrine as envisaged in the Gaza-Jericho Agreement. The Gaza-Jericho Agreement included relatively few civil and economic references. Importantly, the Gaza-Jericho Agreement contained no references, mentions or citations whatsoever to UNCLOS[4] which only came into effect in 1994, and at that time Israel had decided not to join.

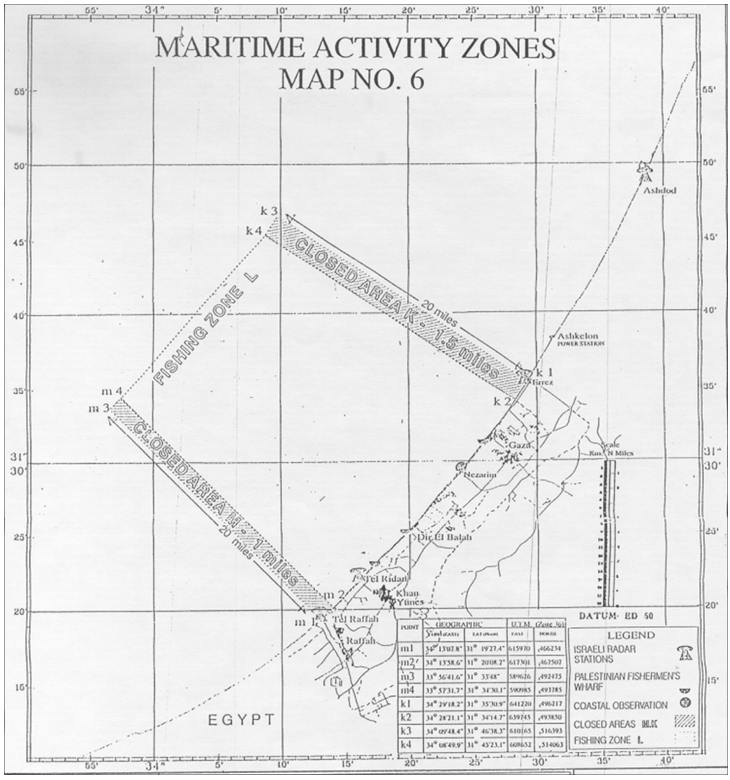

Figure 1: The Gaza-Jericho Agreement (1994) – Maritime Activity Zones Map

However, it is now apparent that Israel actually made a very significant concession to the Palestinians in the Gaza-Jericho Agreement by foregoing claims that it may have had to the natural resources located within the territorial waters offshore Gaza. As was stated in the Gaza-Jericho Agreement, the Palestinian territorial waters were to include the "surface and subsurface" of the waters offshore Gaza. Under Israeli law, the term "territorial waters" is defined as a “strip of open sea along the State's coast measured twelve nautical miles wide from the low tide point of the water on the coast".

4 United Nations Convention on the Law of the Sea ("UNCLOS").

The "Gaza Marine" Reservoir and the Origins of the Modern Doctrine

In 1994, at the time the Gaza-Jericho Agreement was being negotiated, there had not yet been discoveries of offshore oil or gas reservoirs in the waters of Israel or offshore Gaza. And in any case, the technology required for conducting such exploration was not yet readily accessible to the sides – therefore, it can reasonably be assumed that the concession that Israel made to the Palestinians was merely theoretical and devoid of any real meaning to the uneducated eye at that point in time.

It was only in 1999, when the first natural gas field was discovered offshore Gaza (referred to as "**Gaza Marine**") that a new hope emerged – on both sides – for commercial production of natural gas. Following the first discoveries of natural gas, each of the parties suddenly realized that any concession made in the maritime zones had real monetary significance. This realization considerably diminished the parties' willingness to make any more concessions without a comprehensive plan in place.

The assumed location of the Gaza Marine reservoir is approximately 19.4 nautical miles from the Gaza coastline (approximately 22.3 miles or 36 km) and is partly located within the waters for which the Palestinians had obtained a "territorial" claim under the Gaza-Jericho Agreement. Ironically, the geological structure of Gaza Marine straddles the southern extremity of Gaza's territorial waters and therefore some of it lays outside the determination of the territorial waters of Gaza.

In July 2000, after it was already clear that natural gas reserves had been discovered offshore Gaza, the leaders of the time convened a peace summit at Camp David in the United States ("**Camp David Summit**"). The parties were led by US President Bill Clinton, Israeli Prime Minister Ehud Barak and the Palestinian Authority Chairman Yasser Arafat. At the kickoff of the Camp David Summit, the parties clearly understood the significance of the natural gas discoveries and were prepared, from their points of view, to explore several plans of action for developing the reservoirs, either together or separately, and these options became part of their negotiation strategy.

While the parties were negotiating at Camp David seeking a solution to the Israeli-Palestinian conflict, other stakeholders began entertaining new concepts on how best to develop the newly discovered natural gas reservoirs in the Mediterranean.

The Camp David Summit ended in a resounding failure which ultimately led to the outbreak of the Second Intifada. Following the collapse of the peace process thereafter, the parties each decided to focus their efforts on alternative methods

for developing the reservoirs – and in Israel's case, a decision was made to start by developing the offshore reservoirs whose geological structure lay in their entirety on the Israeli side of the maritime border (i.e., reservoirs which came to be named "**Noa**" and "**Mari-B**").

When viewing the timeline below, the key events become clearer:

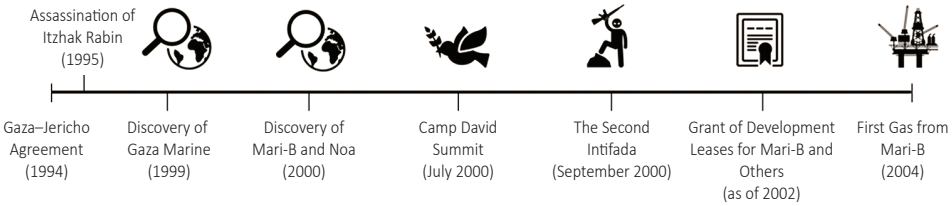

Figure 2: A timeline combining the diplomatic processes and the discoveries and developments of Israel's first natural gas reservoirs in the Mediterranean Sea

Shortly after the failure of the Camp David Summit, the Second Intifada broke out and thereafter Israel implemented its independent strategy for developing its natural gas reservoirs on its own. But yet, Israel continued to hold on to its security interests under the Classic Doctrine offshore Gaza in accordance with the principles of the Gaza-Jericho Agreement, while at the same time carrying out civilian initiatives to develop Gaza Marine and/or other reservoirs positioned on the Israeli side of the Maritime lines.

The Palestinians on their part tried, to the extent capable, to curry political support for the development of Gaza Marine – but of course without an agreement with Israel, they were unable to do so.

The Palestinian Authority was actually very keen on developing Gaza Marine as an obvious Palestinian interest. After all, the Palestinian Authority has very limited sources of energy and little to no independent natural resources or sources of income. The Palestinian Authority was (and is) very much dependent on importing resources for internal consumption primarily from Israel. Amongst other things, the Palestinian Authority imports from Israel electricity, water, fuel and natural gas creating a real dependency.

To the Palestinian Authority, the development of an offshore natural gas field of the size of Gaza Marine could have been an independent source of energy, and a vital source of cash flow which they desperately need ("**Gaza Marine Cashflow**").

Israel, for its part, was weary of developing Gaza Marine since a natural gas field of such magnitude would also entitle the Palestinian Authority to significant portions of the Gaza Marine Cashflow which would translate into a steady flow of unsupervised monies to them with no third party control or supervision. The Israeli concern was the possibility that the Gaza Marine Cashflow would be used for military buildup and funding terrorist organizations in Gaza.

To overcome the potential threat of such abuse, Israel offered the Palestinian Authority alternatives to direct access to the Gaza Marine Cashflow. Such alternatives included third party guarantees, assurances and external supervision to ensure that the Palestinian Authority would not be able to abuse the Gaza Marine Cashflow in favor of military buildup and terrorism.

Alas, the Israeli proposals were rejected by the Palestinian Authority, and the window of opportunity to develop the Gaza Marine field was squandered. At that time, Israel realized that there was no immediate hope of reaching an arrangement with the Palestinians on Gaza Marine and decided to pursue the natural gas reservoirs on the Israeli side and later to begin to import gas from Egypt. That being said, to this day the hope of developing Gaza Marine was never fully abandoned, and Israel has retained the ability to make use of the existing offshore platforms near Gaza (even if only theoretically) to receive the natural gas from Gaza Marine in the future.

The Naval Blockade of Gaza

From 1994 and until 2009, Israel continued to control the maritime zones offshore Gaza according to the Gaza-Jericho Agreement, a task that evolved to be a complicated security challenge for Israel. However, as of 2009 and shortly after (a) Hamas's ascent to power in Gaza; (b) the "Cast Lead" Military Operation; and, (c) Israel's interception of several significant weapon shipments destined for the Gaza Strip – Israel decided to enforce a total naval blockade on Gaza. The legality of said naval blockade was based on the laws of armed conflict at sea which adopted principles from (a) the San Remo Manual,[5] (b) the London declaration,[6] and (c) common international law. The decision to implement a naval blockade of this nature clearly over rid the understandings of the Gaza-Jericho Agreement, however as far as Israel was concerned, the imposition of a naval blockade was an existential imperative and it was left with no other choice.

5 "San Remo Manual on International Law Applicable to Armed Conflicts at Sea" 1994

6 "Declaration concerning the Laws of Naval War". London, 26 February 1909.

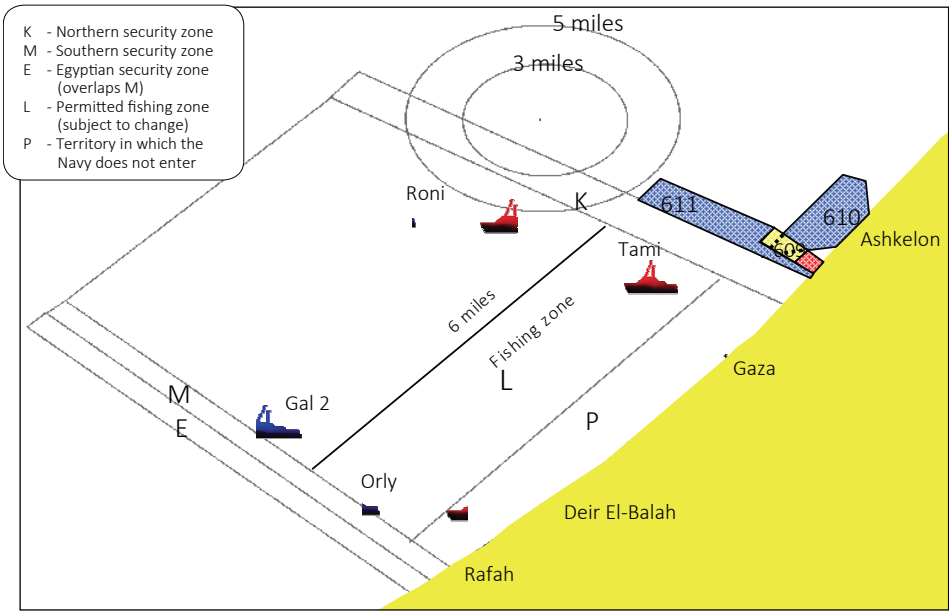

Figure 3: Map of the Naval Blockade on the Gaza Strip (from the Turkel Commission Report, 2010)

The naval blockade of Gaza was (and is) strictly enforced by the Israeli Navy. The maritime zones currently controlled by Israel are very similar to those established in the Gaza-Jericho Agreement however without the involvement of the Palestinian Authority. The naval blockade map indicated above includes a division of maritime zones where non-military vessels are allowed or forbidden to sail.

In this context, it is important to state the obvious – the principles of international law do not represent a single truth and the truth is open to interpretation. Indeed, it can be argued that the naval blockade of Gaza restricts one of the most important principles of the law of the sea which is the principle of Freedom of Navigation. The right to restrict Freedom of Navigation may be established only through international law, legal interpretation and moral justifications. The right to restrict the Freedom of Navigation is conditional on the recognized principles of international law and for part, under UNCLOS.

Following the Mavi Marmara flotilla incident Offshore Gaza[7] ("**Mavi Marmara Incident**"), a UN committee was set up by the UN Human Rights Council[8] (the **"Committee of the UN Human Rights Council"**). The Committee examined the Mavi Marmara Incident and overruled most of Israel's justifications of the naval blockade of Gaza.[9] Israel did not take an active part in the Committee of the UN Human Rights Council and outright rejected its conclusions. In parallel, Israel investigated the events on its own through the Turkel Commission[10] and reached opposite conclusions.

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7 The legality of the naval blockade on the Gaza Strip was debated extensively following the Mavi Marmara flotilla incident, which occurred in May 2010. Recalling that a flotilla, which included several boats sailing from Turkey, departed en-route to the Gaza Strip with the intention of transferring humanitarian equipment to the Gaza Strip but with the undeclared intention of breaking the naval blockade imposed by Israel by force. The State of Israel had information that the organizers of the flotilla intended to create a provocation and attempt to break through the naval blockade by force to challenge the legality of the naval blockade and put the issue on the global agenda. The Israel Navy and its marine commando subdued the flotilla by force outside the territorial waters while it was on its way to Israel and before it reached the Gaza Strip. During the takeover at sea, the Israeli Navy soldiers were assaulted by the activists on the flotilla, who used clubs, bars, and knives. As a result, nine of those on board the Mavi Marmara were killed by IDF forces and another 20 were injured.

8 "Report of the international fact-finding mission to investigate violations of international law, including international humanitarian and human rights law, resulting from the Israeli attacks on the flotilla of ships carrying humanitarian assistance"

9 "The Mission finds that the policy of blockade or closure regime, including the naval blockade imposed by Israel on Gaza was inflicting disproportionate civilian damage. The Mission considers that the naval blockade was implemented in support of the overall closure regime. As such it was part of a single disproportionate measure of armed conflict and as such cannot itself be found proportionate [...] Furthermore, the closure regime is considered by the Mission to constitute collective punishment of the people living in the Gaza Strip and thus to be illegal and contrary to article 33 of the Fourth Geneva Convention".

10 The Turkel Commission established several legal principles which have underpinned, in terms of international law, the legality of the naval blockade of Gaza. *Inter alia*, the following conclusions were set forth: (a) the conflict between Israel and the Gaza Strip is an armed international conflict, (b) the purpose of the naval blockade that Israel has imposed on the Gaza Strip is, primarily, a military-security purpose, (c) the naval blockade on the Gaza Strip is legally imposed by Israel, and Israel fulfills the conditions for its imposition, (d) Israel fulfills its humanitarian duties that are applicable to a party imposing the naval blockade, including the prohibition on starving the population, abstention from preventing the supply of vital means to the civilian population, the transfer of medical supplies and the requirement for proportionality, and (e) international law does not give individuals or groups the freedom to ignore the fact of the imposition of a naval blockade, which is in compliance with the conditions for its imposition and which is being enforced accordingly, in particular where it fulfills the commitments toward neutral entities merely on the grounds that in the opinion of these individuals or groups its imposition violates the duties of the party imposing the blockade toward the entity subjected to the blockade.

Shortly thereafter in September 2011, the UN Secretary General published his own conclusions on the Mavi Marmara Incident ("**Palmer Report**")[11] which stated, inter alia, that the imposition of a naval blockade on Gaza by Israel was "a legal security measure intended to prevent weapons from reaching the Gaza Strip by sea and its enforcement is being done in accordance with international law".[12]

The "Guardian of The Walls" Operation and its Implications on The Future of Gaza

In May 2021 Israel was once again dragged into a military operation against the Hamas leadership in Gaza during the "Guardian of the Walls Operation". The military operation began in retaliation to massive rocket fire directed toward population centers in Israel from Gaza. The rockets were fired by Palestinian organizations led by Hamas. The Palestinian weapons that were used against Israel had been smuggled into or built in Gaza precisely as Israel had foreseen throughout all the years of peace negotiations. The Guardian of The Walls Operation lasted 11 days. Over 4,000 rockets and mortars were fired toward Israel from Gaza during the military operation. A large part of these "high trajectory" weapons were intercepted by Israel's Iron Dome system, but some landed inside Israeli territory. The rockets aimed toward Israel caused the death of civilians and foreign nationals and damaged homes and infrastructure. The rockets were detrimental to Israeli national resilience, undermined the sense of safety and security of the local population and ignited riots in Arab neighborhoods and towns in Israel.

In response to the rocket fire, the Israeli Defense Force ("**IDF**") employed a policy of hitting and destroying Hamas government centers in Gaza by toppling high-rise buildings housing key Hamas strongholds, hitting the homes of Hamas leaders and destroying other infrastructure used for battle. In addition, the IDF destroyed

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11 "Report of the Secretary-General's Panel of Inquiry on the 31 May 2010 Flotilla Incident", September 2011, Sir Geoffrey Palmer, Chair ("The naval blockade was imposed as a legitimate security measure to prevent weapons from entering Gaza by sea and its implementation complied with the requirements of international law").

12 "The fundamental principle of the freedom of navigation on the high seas is subject to only certain limited exceptions under international law. Israel faces a real threat to its security from militant groups in Gaza. The naval blockade was imposed as a legitimate security measure to prevent weapons from entering Gaza by sea and its implementation complied with the requirements of international law… All States should act with prudence and caution in relation to the imposition and enforcement of a naval blockade. The established norms of customary international law must be respected and complied with by all relevant parties. The San Remo Manual provides a useful reference in identifying those rules".

underground tunnels spanning the Gaza subsurface which had been secretly built using massive financial resources over the years. The construction of these underground tunnels was evidently financed by foreign entities from outside Gaza. Such use of funds for military buildup and terrorism goes directly to the traditional Israeli position with respect to the possible uses of any future Gaza Marine Cashflow. Clearly, from an Israeli perspective, the events unfolded precisely as Israel had foreseen and they place a serious question mark over the ability to carry out any future negotiations on the development of Gaza Marine with respect to the Gaza Marine Cashflow, which undoubtably would need to be monitored and supervised.

Figure 4: Iron Dome in action during Operation Guardian of the Walls[13]

Figure 5: Israeli natural gas platforms as military targets for Hamas

Ironically, during the "Guardian of the Walls Operation" Hamas even fired rockets toward the Israeli offshore platforms opposite the coast of Ashkelon even though strategically such offshore platforms could serve as vital infrastructure for the future development of Gaza Marine.

The result of the Guardian of the Walls Operation placed a heavy burden on the people of Gaza and caused havoc and destruction which has only increased the Palestinians' dependence on Israel. The devastation in Gaza following the Guardian of the Walls Operation is apparently tremendous, and the reconstruction of Gaza will require huge investments in the coming years. Where will such finances come from?

UNCLOS and The Modern Doctrine

The past events described above, have been detrimental to the prospects of finding a solution to the Israeli-Palestinian conflict. But looking ahead, and as will be further

13 *YNET*, Iron Dome interceptions over the community of Yatsits (photo: Elad Gruber) "Were you absent from work due to the security situation? These are your rights", May 2021 (By: Lital Dobrowitski)

examined hereto, the Modern Doctrines that have evolved and have the potential of bringing a positive effect in getting peace talks back on track. It is precisely out of a sense of shared responsibility and for the sake of future generations, that the parties must continue to try and map out common interests to form fertile ground for a sustainable solution.

Israel and the Modern Doctrine

The first indication of the emergence of Israel's Modern Doctrine can be deciphered from the draft Marine Areas Law which has been under discussion in the Knesset for several years (**"Proposed Law**").[14] In the Proposed Law, Israel introduces its maritime goals which are clearly discernable. For the first time in Israel's history, the Proposed Law also includes a combination of economic and environmental interests alongside Israeli security and political interests with regards to its claims to the sea. The Proposed Law seeks to adopt certain aspects of UNCLOS into new Israeli legislation.

Since there is territorial and geographic continuity between Israel's Exclusive Economic Zone ("EEZ") and Egypt's EEZ to the south, one may deduce that the Modern Doctrine will be closely managed and monitored in coordination with Egypt.

Israel's maritime goals, inter alia, are to (a) strengthen Israel's prevention and detection capabilities within its EEZ; (b) exercise its sovereign rights; (c) ensure the development and exploitation of its natural resources; and (d) promote the protection of the marine environment. An additional vital interest to Israel is to establish and maintain "**Energy Security**".[15]

To ensure the development and exploitation of Israel's natural resources Israel has published a map indicating its offshore exploration blocks. Israel's offshore exploration blocks provide a visual depiction of the Modern Doctrine in the Mediterranean Sea.

Recalling that Israel has been engaged in oil and gas exploration and production for over twenty years and has accrued considerable knowledge and experience in this area. The offshore exploration blocks maps are accompanied by previous statistics and probabilities of discoveries based on previous exploration activity conducted in the region and a data room on the geology of the region.

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14 Proposed Marine Areas Law–2017 (Section 1 – Goals).

15 "**Energy Security**" is the uninterrupted physical-availability at a price which is affordable, while respecting environment concerns (The International Energy Agency & The Tsemach Committee Report).

From the offshore exploration blocks map below, one can deduce that Israel has accomplished its existential needs in terms of governance and military control offshore Gaza and has begun its shift to a more operative approach focusing on the economic impact of establishing and controlling its EEZ.

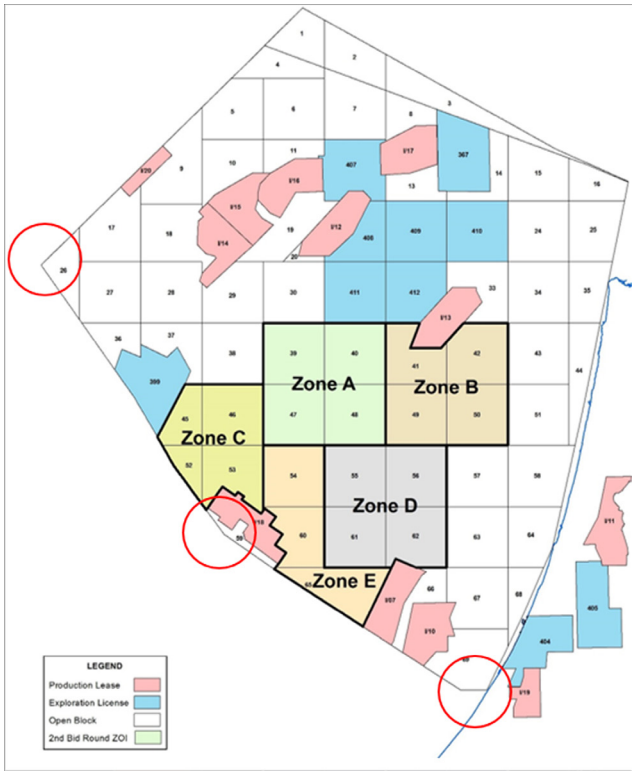

Figure 6: Map of the Competitive Process for New Exploration Blocks

In the offshore exploration blocks map, Israel has projected its semi-official maritime boundaries, according to its own interpretation, which have been adjusted according to the geology of the region, international agreements, and the principles of international law. Israel has declared, *de facto*, an EEZ.

Based on this offshore exploration block map (which purpose is completely different to the purpose of the map introduced during the Gaza-Jericho Agreement) Israel completed a competitive process which led to the granting of new exploration blocks to bidding concessionaires who are willing to carry out exploration in the area. In 2019, the competitive process focused on the southern region of the EEZ, near Gaza. Five companies won 12 new blocks during this proceeding. It can be

concluded that Israel will eventually allow these companies to explore and develop oil and gas reservoirs in Israel's southern maritime border region once again.

However, a point of concern to Israel on this matter are the semi-official maritime coordinates of its maritime borders identified on Israel's exploration map, which have not been finalized in binding maritime delimitation agreements with Israel's neighbors. The coordinates circled in red on the exploration map represent the meeting points between Israel and its neighbors' maritime boundaries and EEZ's.

Thus for example – a seemingly simple coordinate at the westernmost point of the Israeli EEZ, at the confluence of the maritime boundaries between Cyprus, Egypt and Israel (a three-way confluence) would require a tripartite agreement between the Cyprus, Egypt and Israel; similarly, at the center of the southern maritime border – at the confluence of the maritime borders of Egypt, Israel and the Palestinian Authority (a three-way confluence) would also require a tripartite agreement between Egypt, Israel and the Palestinian, and the same logic would apply to the easternmost, the meeting point between Gaza and the State of Israel.

The maritime boundaries established in the exploration block map are obviously inspired by the principles of UNCLOS, and foregoes (or simply ignores) the Classic Doctrine map set forth the Gaza-Jericho Agreement.

In other words, Israel is redrafting its maritime boundaries in accordance with the principles of UNCLOS and has effectively switched to a totally new method of viewing and understanding the boundaries of its EEZ.

The Israeli Modern Doctrine focuses primarily on establishing and managing Israel's rights in its EEZ, and has moved away from the Classic Doctrine which prime purpose was to establish military control over the maritime region of Gaza. Israel is now more interested in achieving recognized international maritime boundaries than establishing its control of the waters offshore Gaza.

UNCLOS is a universal document and is perceived as a constitution of sorts for the seas, and is not perceived to be a military document despite its various brushes against such issues. Importantly, Israel is not a signatory to UNCLOS, but makes effort to align its actions to customary international law and the principles of UNCLOS.

With respect to UNCLOS, Israel has developed a two-fold interest: on the one hand, Israel wants to preserve its grip on its natural resources in its EEZ and also to gain international recognition of its maritime borders, and on the other hand, Israel

wishes to maintain its strategic interest of negotiating from a position of strength vis-à-vis the Palestinians with respect to a future peace agreement.

In other words, Israel is gradually shifting the center of gravity of future negotiations through the filter of UNCLOS, which can be of service to both sides for finding a settlement for the Israeli-Palestinian conflict. And so (and not by accident) in the absence of Palestinian ability to break the naval blockade of Gaza imposed by Israel or to make any diplomatic progress following armed conflict and offences, a mutual process has begun of ridding each other of past agreements and developing Modern Doctrines which focus on achieving internationally recognized maritime boundaries and establishing ownership of offshore natural resources.

The principles of the Modern Doctrine are far more complex, far more international and require a deep skill and technical understanding with respect to international maritime law and oil and gas offshore development schemes (which neither side necessarily has abundance of) – but on the other hand, the principles of the Modern Doctrine have a better chance of bringing about actual results which addresses the real needs of both sides along with a clear economic facet.

But still, as has already occurred in the past, neither Israel nor its neighbors are waiting patiently to reach an agreement, and each side is also simultaneously pursuing options for developing new offshore reservoirs without obtaining consent from its partners on the other side of its side of the maritime border.

To demonstrate, both Israel and Egypt, are continually exploring their waters for new oil and gas reservoirs. On the Israeli side, new reservoirs have already been discovered – for example the Shimshon, Dalit concessions and others – and on the Egyptian side there have also been significant discoveries under the Zohr, North Theka and Nour concessions.

The Palestinian Authority and the Modern Doctrine

The Palestinians, too, have learned their lessons from the Gaza-Jericho Agreement and have realized that it would better serve their interest to concentrate on civil-economic interests rather than on the map forged from an Israeli security-political perspective.

In 2012, the United Nations granted the Palestinians a "Non-Member Observer State Status". Thus, by joining the United Nations as a Non-Member Observer State, the Palestinian Authority have opened new diplomatic possibilities which had until then been reserved exclusively to sovereign states.

Realizing that the maritime zones are of great strategic and economic value, it appears that the Palestinians are now just as eager as Israel to shake off past agreements and to adopt a new maritime map for themselves which from their standpoint covers all of their national aspirations.

Figure 7: Perception of the Maritime Zones From the Palestinian Perspective Since 2015

And indeed, the Palestinians have formed a Modern Doctrine of their own which includes far-reaching claims to the sea offshore Gaza which clearly contradicts past agreements with Israel with regards to control and claims over the territorial waters of Gaza.

In 2015, the Palestinian Authority became a signatory to UNCLOS under special status.[16] In September 2019 the Palestinians unilaterally submitted a maritime map

16 "Declaration of the State of Palestine regarding the maritime boundaries of the State of Palestine in accordance with the United Nations Convention of the Law of the Sea", August 31, 2015.

to the UN which from their perspective constitutes a declaration of an EEZ within their maritime boundaries.[17] The new Palestinian maritime map indicates that in their view, the maritime boundary of Gaza extends from the shoreline of Gaza at both ends along the maritime boundary lines of Egypt and Israel up to the Cypriote maritime border and totally separates between Israel and Egypt.

Additionally, in a complementary and semi-supportive way (apparently not coincidentally), a new Turkish political doctrine was issued which defines the southern maritime boundary of Turkey and/or the Turkish Republic of North Cyprus ("**TRNC**") as being connected to, with a direct maritime corridor and territorial continuity to the western maritime boundary of the sea opposite Gaza. Quite clearly, under this logic, Turkey would also be interested, if it had the chance, in reaching a parallel delimitation agreement with Israel at the point of confluence of the maritime border next to, or instead of Cyprus, and thus to abrogate the existing maritime delimitation agreement between Israel and Cyprus signed in 2010 on the delimitation of the western maritime boundary.[18]

Turkey, Cyprus, Egypt and the Modern Doctrine

The irony of the combined Turkish-Palestinian Authority position is that while the Palestinian Authority is using UNCLOS to establish its regional claim to an EEZ offshore Gaza, Turkey and the TRNC (which is not an internationally recognized state and are certainly not signatories to UNCLOS) stake their claims outside the context of UNCLOS in accordance with signatory older principles from the Convention on the Continental Shelf which predates UNCLOS.[19]

This is clearly a declarative strategy by Turkey and the Palestinian Authority to create an "alternative approach" to the newly forged Israeli-Egyptian positions from an adversarial standpoint, and to challenge new regional collaborations. A key interest is also to thwart potential routes for the construction of a subsea natural gas pipeline from Israel to Europe and/or to Egypt.

Moreover, the Turkish strategy challenges Cyprus' sovereign rights to an EEZ without obtaining Turkey's prior consent. As such, perhaps more importantly, the Turkish Modern Doctrine establishes claims of shared ownership over all of the natural

17 "Declaration of the State of Palestine regarding the maritime boundaries of the State of Palestine in accordance with the United Nations Convention of the Law of the Sea", September 24, 2019.

18 "Agreement between the Government of the State of Israel and the Republic of Cyprus on the Delimitation of the Exclusive Economic Zone" (December 2010).

19 "Convention on the Continental Shelf" (1964).

resources in the Cypriot EEZ. The Turkish strategy also attempts to create public sentiment that Turkey is a powerful, legitimate patron of the Palestinian people looking out for them at the international level.

Of course, in response to the publication of the new Turkish-Palestinian Modern Doctrine, Cyprus immediately submitted its objection to the United Nations regarding the Turkish claims over Cyprus' recognized maritime boundary and EEZ.[20]

This is surely a development which adds another layer of complexity to an already volatile situation and which is intended to delay, disrupt, defy, and deter against any unilateral action on the part of any one of the parties in the Mediterranean without Turkish consent.

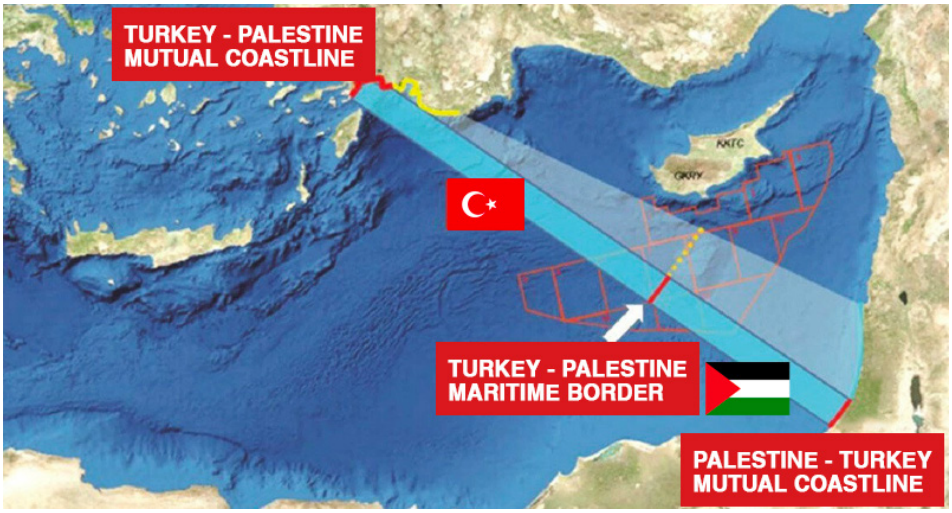

Figure 8: The Turkish-Palestinian interpretation of the territorial continuity between the EEZ of the Gaza Strip and that of the TNRC[21]

According to the Palestinian Modern Doctrine, all of the natural resources located in the so called EEZ offshore Gaza are attributed to the Palestinian Authority.

To these claims, Israel's response was promptly issued in January 2020. Israel filed an official objection with the United Nations concerning the Palestinian declaration

20 "Letter dated 24 April 2020 from the Permanent Representative of Cyprus to the United Nations addressed to the Secretary-General".

21 Turkish-Palestine EEZ delimitation proposal causes panic in Israel and Greece, *United World International*, May 19, 2021.

of an EEZ. The legal grounds for the Israeli objection have been that the Palestinian Authority has no sovereign rights as an independent state in accordance with UNCLOS since it is not a sovereign state. In other words, Israel claims that only sovereign states have the right to declare their EEZ's in accordance with UNCLOS as follows:

> Only sovereign states have the rights to maritime zones, including territorial seas and exclusive economic zones, as well as the right to declare maritime boundaries.[22]

Moreover, Israel claims that the Palestinian Authority does not meet the definition of a "State" in accordance with international law and it therefore has no right to claim maritime zones.

> The Palestinian entity does not satisfy the established criteria for statehood under general international law and therefore lacks the legal entitlement to such maritime zones.[23]

In parallel, Egypt also filed an objection with the United Nations regarding the Palestinian EEZ under the Modern Doctrine, objecting to their depiction of the maritime boundary between Gaza and Egypt on the southern Gaza maritime border, but not for the same reasons as Israel.

According to the Egyptian position, the maritime space that the Palestinian Authority has claimed for itself as its EEZ, or a large part thereof, is actually within Egypt's EEZ. As such, a potential new maritime conflict has emerged between Egypt and the Palestinians.[24]

But this may not necessarily play out in Israel's favor. It is important also to bear in mind that Egypt has no actual objection, in principle, to claims of sovereignty being made by the Palestinian Authority as if it were a sovereign state. As of today, Egypt and the Palestinian Authority have set up bi-lateral negotiation teams which are seeking a settlement on the maritime boundary matter between them.[25] The pièce de resistance from the Palestinian Authority's standpoint after such negotiations (if and when they will be successfully concluded) will be achieving international recognition in terms of sovereignty, from Egypt under UNCLOS which could consolidate its status as a de facto sovereign state – which is a primary Palestinian interest.

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22 "Communication dated 14 January 2020 from the Permanent Mission of Israel to the United Nations addressed to the office of the Secretary-General of the United Nations".

23 Ibid.

24 "Communication from the Permanent Mission of Egypt to the United Nations transmitted to the Secretary-General", 31 December 2019.

25 "Egypt to negotiate sea border with Palestine", *Al-Monitor* (November 2020)

Maritime Delimitation, Economic Interests, Development of Cross-Border Reservoirs and Natural Gas Export – Maximizing the Potential for Regional Cooperation

As it is gradually coming to play, there are many conflicting interests, interpretations and legal complexities in the Mediterranean Sea. An important factor to bear in mind is that in the Middle East there has always been invariably over-involvement of external state players and regional powers closely watching the maritime arena in order to understand, in real time, what the regional balance of power is.

Israel's gas reservoirs are quite ample and can satisfy Israel's and neighbor's energy needs far beyond their existential needs for years to come. Many other countries in the region (with emphasis on Europe) have acute shortages of independent energy sources and each are trying to decipher the potential of natural gas exports from the Mediterranean Sea for their own benefit. External involvement has become so extreme, that some countries in the region are willing to initiate, finance and accept constraints and dictations to win the vital reward and pave the way for the natural gas exports to reach them.

From a strategic perspective, the better Israel learns to leverage its special status as a natural gas exporter, the greater the benefits Israel will be able to reap. A smart strategic play by Israel will result in increased political, diplomatic, and economic clout for Israel.

And so, the evolution of the Israeli-Palestinian conflict is shifting to the sea. The shift has the potential to bring with it a comprehensive regional settlement. But the true challenge will be to successfully negotiate a string of inter-connected diplomatic and commercial agreements between multiple parties which will be highly technical by nature. The achievable goals of such agreements could include (a) international recognition of Israel's maritime boundaries; (b) determining the ownership of the offshore natural resources; (c) settling the division of profits with respect to the Gaza Marine Cashflow and other cross-border fields, and (d) development of new offshore oil and gas reservoirs which could be diverted for export – and all outside the context of the Classic Doctrine between the Israelis and the Palestinians.

Subsea Pipelines, Floating Infrastructure, Liquefaction and Regional Exports

But – to achieve all of the above, it is imperative to very clearly understand the technological aspects of deep-sea oil and gas exploration, unitization agreements and the various technical requirements for developing offshore infrastructure for this purpose.

There are many options for executing substantial offshore projects in the Mediterranean Sea. Israel and Egypt have already proven beyond reasonable doubt that investing in the development of deep-sea oil and gas reservoirs is diplomatically, technically and economically feasible with a high degree of certainty.

Figure 9: The Tamar Platform and The Mari-B Platform

Figure 10: The Future of the Mediterranean Floating Liquefied Natural Gas Extraction and Production Floating Liquefied Natural Gas (FLNG)

Energy experts believe that even as far as 2050 (at least) the world will still be consuming fossil fuels and byproducts derived from offshore oil and gas reservoirs. Therefore, there is still an urgent need to continue the development of oil and gas fields even during a time of climate change and the global paradigm shift to use of cleaner energy sources. Therefore, the window of opportunity for achieving the goals of the Modern Doctrines has not yet passed.

For example, if Israel and the Palestinians were to decide that Gaza Marine could be developed as a means to kick start the implementation of the Modern Doctrine in the Mediterranean Sea, the concept of reuse of existing offshore infrastructure near Gaza could be revisited immediately. The reuse of existing infrastructure would be a cost-effective measure and could shorten the development time of Gaza Marine significantly.

Another good example of the reuse potential of existing offshore infrastructure in the Mediterranean Sea is the reuse of the EMG gas pipeline offshore Gaza which was originally built to import gas from Egypt to Israel, and today is used to export Israeli gas to Egypt. The time for completion of the conversion of the EMG pipeline was significantly shortened and was conducted within a very strict budget not long after the EMG pipeline was acquired by its new owners – Noble Energy (now Chevron) and Delek Drilling.

Furthermore, additional projects have already passed the *proof of concept* phase including plans for mega-investments such as the construction of an offshore natural gas pipeline gas from Israel to Europe via Cyprus, or deep sea floating alternatives such as constructing several Floating Liquefied Natural Gas (FLNG) Facilities in the Mediterranean Sea for export purposes.

Conclusion & Recommendations

There is no doubt that the emerging Modern Doctrines represent a new starting position for future negotiations between Israel, Egypt, and the Palestinians. The Modern Doctrine has the potential to change the balance of power in the region so long as it remains outside the military-political context.

In the Modern Doctrine era, it will be possible, through exploration and development of offshore infrastructure and projects, to reach agreements on the maritime boundaries of the various states in the region and discussing ways for distributing profits and royalties between stakeholders with regards to such oil and gas developments. It will also be possible to make sure that the use of any cash flow from such projects is put to further use for regional development, rather than military and terror buildup.

The financing for such mega projects could be provided by state-sponsored stakeholders called upon which have a vested interest in developing the region (such as the UAE, Gulf States, Turkey and others). As the tensions are relieved through further negotiation, fruitful collaboration may emerge and investors will seek to get involved.

It is imperative to remember that the people of Gaza are suffering from overpopulation, shortage of raw materials, lack of financing and lack of energy sources and the Modern Doctrine could primarily bring hope to the people of Gaza.

To summarize, the achievable interests through future negotiations and the development of the Modern Doctrine are as follows:

1. A permanent settlement of the maritime boundary's disputes between Israel, Egypt and the Palestinian Authority.
2. The further development of cross-border oil and natural gas reservoirs (and/or oil and gas reservoirs on either side of a recognized maritime border).
3. The continuous supply of natural gas, raw materials or electricity to Gaza and regional players directly from offshore infrastructure.
4. The construction of purpose-built offshore infrastructure, or the re-use of existing offshore infrastructure including artificial islands offshore Gaza for energy project purposed.
5. The financing and investments in the energy-sector by state-sponsored stakeholders in the region.

A Model for an Israeli Academic Marine Monitoring System

Semion Polinov and Shaul Chorev

The prosperity and safety at sea of many coastal nation-states are associated with the maritime domain in their region. For several decades, maritime domains have undergone a significant process of geopolitical and environmental changes (Bueger, 2015; Bueger & Edmunds, 2017). Demographic growth and rising living standards are constantly increasing the pressure on the marine environment, forcing it to generate resources, and contributing to the shift away from land-based resources to find new resources at sea (Tournadre, 2014). The discovery of new resources and the technological development that allows them to be extracted increases the economic importance of Exclusive Economic Zones (EEZs) (Katsanevakis et al., 2015). In recent years, the use of the maritime domain for various purposes has increased. This is due to increased demand for the uses and activities that have historically existed in the area, such as sports and recreation, as well as fishing and shipping, and as a result of the emergence of new key players on the scene; primarily the discovery of natural gas and subsequent activities related to the extraction and processing of gas. The increasing pressure on the maritime domain such deliberate oil spills (Polinov et al., 2021) and the exploitation of its resources (Kark et al., 2015) as a result increase the pressure on the marine ecosystem (Halpern et al., 2008, 2015). The marine ecosystem provides critical services and functions as the basis for many human activities at sea (Cheung et al., 2009). It is home to a variety of marine species and provides ecosystem services such as stocks of marine food for fisheries and water for desalination, as well as regulatory services such as fertilizer processing and CO_2 sequestration (Planning Administration, 2016) to increase Israeli maritime security (Fig. 1).

Maritime security has been a buzzword in recent years (Bueger & Edmunds, 2017), while climate change and pandemic are among the main factors that weaken the maritime security of coastal countries (Agarwala & Polinov, 2020; Germond & Mazaris, 2019). State Maritime Safety achieves its meaning through identifying the participants in the process, identifying existing and potential problems and acting out of the desire to find approaches and solutions for them, while the practical meaning will always vary depending on the real situation. Therefore, striving for a universally acceptable definition of maritime safety and technological platforms is counterproductive (Bueger & Edmunds, 2017).

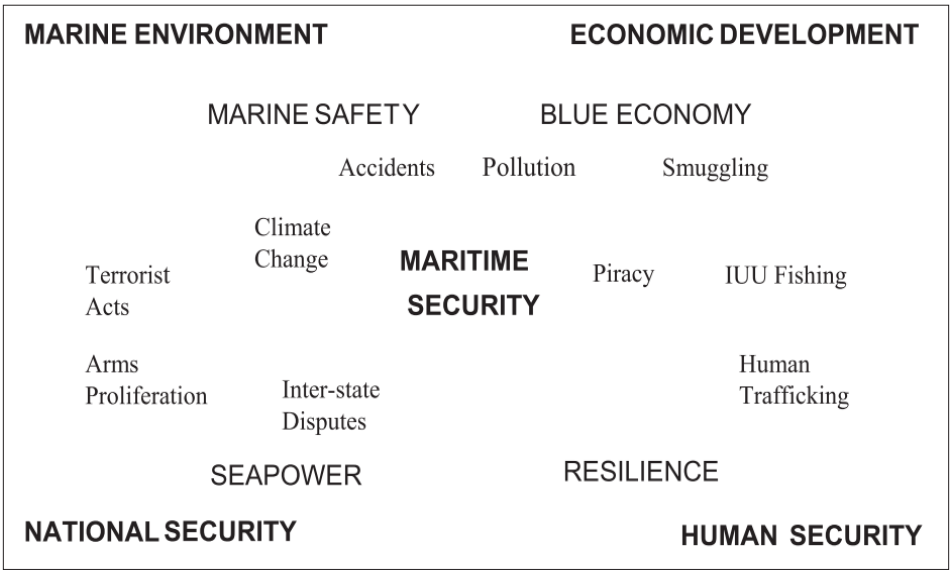

Figure 1: Range of threats for Israeli maritime security that the National Maritime Monitoring System should track (Bueger, 2015)

In this article, we try to develop geospatial concept to deal with the multilingualism of the concept, with a focus on Israel's maritime realm. The current model, based on a study of existing monitoring systems such as the Sea Coastal Monitoring System, is a consortium of supercomputers for modeling and managing large databases, whose members include Italian universities, national research centers, and private enterprises and is engaged in a wide range of research (Serra, 2021).

Israeli Maritime Security

Israel's EEZ area in the Mediterranean is about 24,000 km^2 (vs 20,500 km^2 according to the 1967 Israel border) and can meet many of the needs of society, the economy, and the environment (Planning Administration, 2020). It contains enormous potential energy resources, is a major source of domestic water production, and also contains valuable natural and heritage resources (Rettig, 2017). The maritime domain is the main commercial and infrastructure bridge to the rest of the world and can be seen as a future land reserve for infrastructure development and perhaps even urban development. At the same time, the sea area is also Israel's "blue lungs," offering vast open seascapes and opportunities for recreation and entertainment (Gour Lavie, 2018). In recent years, marine domain, due to nascent human activities, has become an arena of conflict between these uses and the natural and heritage resources it

harbors (Fröhlich, 2016; Kark et al., 2015; Laubier, 2005). Moreover, the technological improvement increases the more complicated (Chorev, 2020). However, there has been no overall maritime planning so far, and there are currently no strategies about this area, especially when compared to the level of administrative concern and planning efforts set aside for the land-based portion of Israel (Technion, 2015).

This article presents a conceptual model of regional monitoring system of the sea-neighboring territories of Israel based on modern methods of remote sensing of the sea and data processing in Geographic Information Systems (GIS), with the main goal of ensuring the range of threats to Israel's Maritime security.

Israeli Academic Marine Monitoring System (IAMMS)

The proposed IAMMS aims to develop long-term knowledge in the field of oceanography, oil and gas, marine environment, regional security and foreign policy, mobility of goods and people, maritime law and security, with a focus on relevant areas for Israel's maritime security (see Fig. 2):

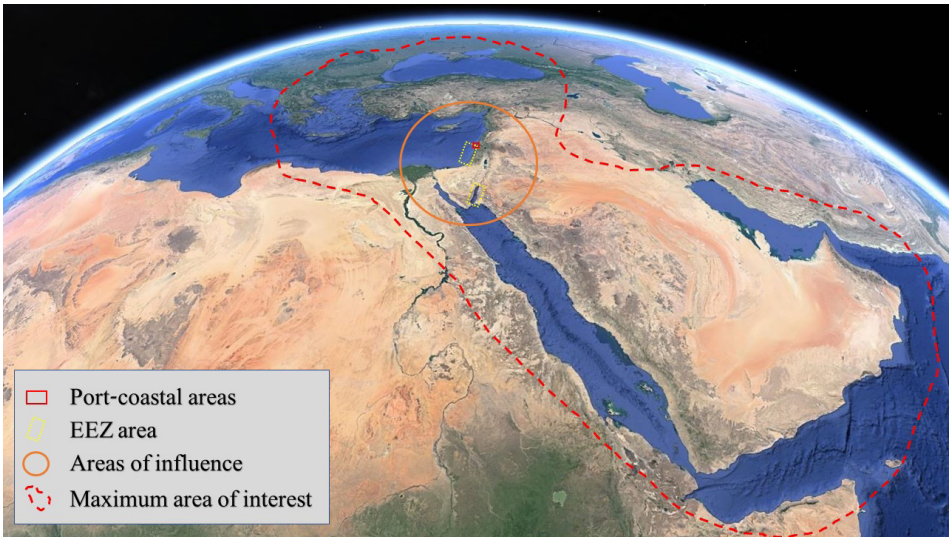

Figure 2: Proposed areas for the Israeli Maritime Environmental Monitoring Program

1. Ports/coastal area: an area with high sensitivity due to the presence of a large number of infrastructures important to the state, dense populations along the coastlines.
2. EEZ: an area in which Israel has the full right to extract useful natural resources, but also because of "freedom of navigation" all types of ships are free to sail

through this area. Due to the dominant southwestern currents, the coastal zone is heavily influenced by various processes in this area.

3. Area of influence: the different types of processes of origin in this territory in many cases do not have a direct impact, but rather have an impact indirectly through political and economic processes, for example, Turkish geophysical research in the EEZ of Cyprus.
4. Security: remote areas in which Israel is conducting activities that can have a significant impact on Israeli maritime security. An example is the Iranian attack on ships (with Israeli ownership) in the Persian Gulf and the impact of these attacks on the freedom of navigation of ships under Israeli ownership.

In 2021, the Eastern Mediterranean and surrounding regions were characterized by environmental instability. One of the oil spill incidents occurred in February 2021—an oil spill from an unspecified source (possibly an Iranian tanker that left the Suez Canal) reached the coast of Israel (Ministry of Environment Protection, 2021), without any early detection at sea, which led to severe pollution of Israeli territory. In addition, in 2021, the desalination plants stopped several times due to sea pollution, apparently due to algal blooms, also without early warning. The ongoing pollution problem of the Banias in Syria, which miraculously did not reach the coast of Israel, continued to pour oil for three months; there are also potentially dangerous sources of pollution of the sea. In most cases, Israelis and decision-makers are aware of such ecological incidents, with late forestry opportunities to react as early as possible and thereby reduce potential harm.

In the Red Sea region, the signing of the Abraham Accords brought an increase in the number of tankers shipping to the terminal in Eilat. About five oil tankers arrived in the first months of 2021 from Saudi Arabia. While we know little about the ships that arrived at the port of EAPC Eilat oil terminal and their ecological history, it is possible to say with a high level of accuracy that this made a certain negative contribution to the local marine ecology, apparently without a detailed environmental analysis and compliance with the Ministry of Environmental Protection's rules or its approval, which led to the suspension of work. At the same time, several kilometers away in the port of Aqaba, most of the time at least one tanker would be in the process of unloading while another one would be waiting (see Fig. 3).

Another significant incident was the Suez Canal congestion on March 23, 2021, by the "*Ever Given*" cargo ship (Fig. 4), which lasted for about a week. This instantly affected at least 400 ships and led to significant economic damage to the maritime industry ($15-17 billion), the remnants of which will appear in the global economy for a long time (Man-Yin Lee et al., 2021).

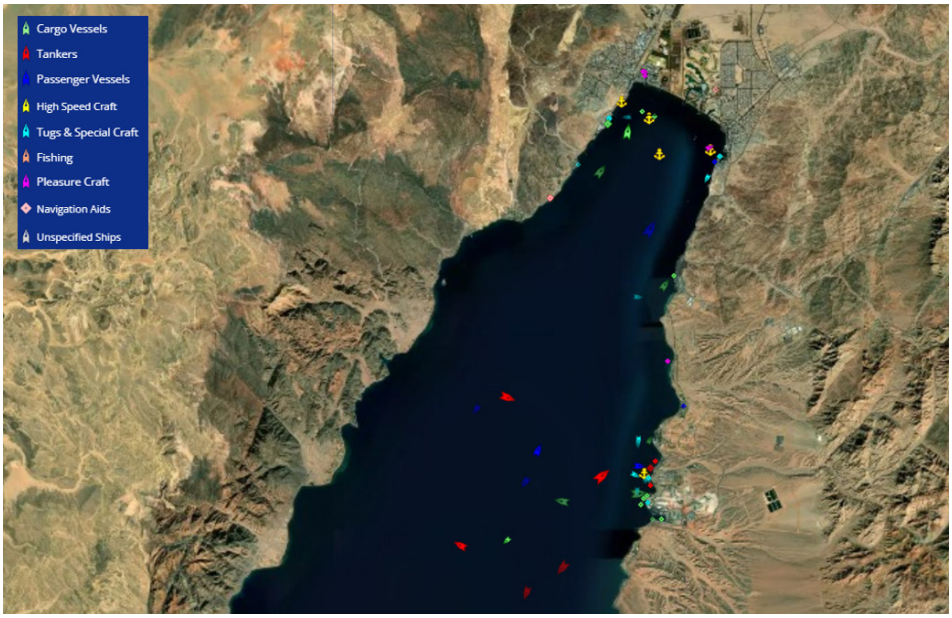

Figure 3. Vessels in Gulf of Aqaba. Red vessels represent oil tankers (source: www. marinetraffic.com, 24/11/2021, 16:00). Eight tankers in Aqaba port, zero tankers in Eilat port.

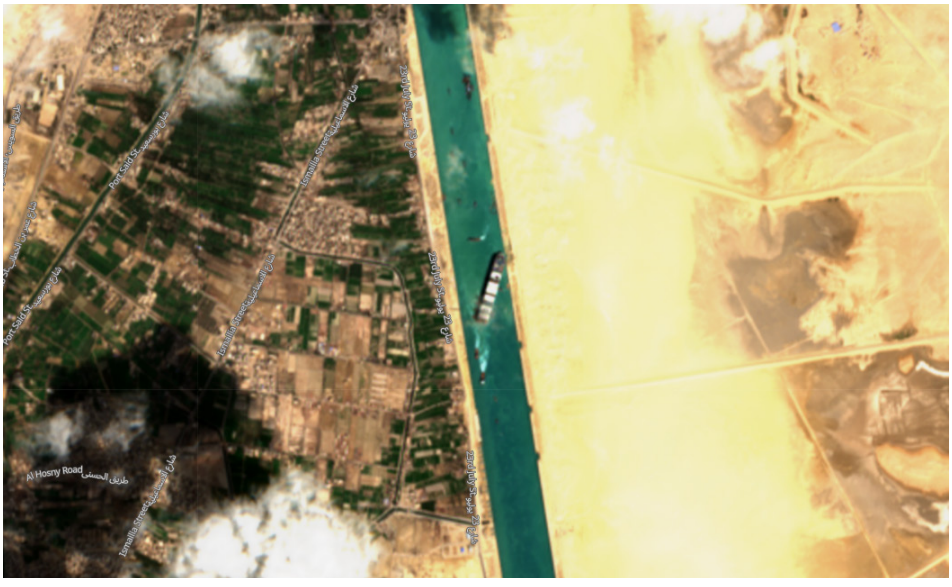

Figure 4. Satellite image of Sentinel-2 showing the "*Ever Given*" stuck in the Suez Canal (29/03/2021).

Overall, 2021 has been characterized by a significant increase in activity in the Red Sea region, both military and with incidents of attacks on ships as part of the Israeli-Iranian campaign and civilians.

Levels of Israeli National Monitoring Platform

- **Early detection**: Early detection of events in the marine environment that could affect the national security of Israel: desalination, seawater quality, port management, protection of seabed infrastructure, mapping the impact of various maritime activities—all highly dependent on the seawater quality.
- **Validation**: A remote sensing platform could be used as a validation method for the processes that take place in the marine domain.
- **Evaluation**: Evaluation of short-term and long-term marine environmental processes, such as sea surface temperature (SST) or sea salinity.
- **Analyzing**: Spatial and temporal processes analysis in nearby areas that could potentially affect Israeli maritime security.

Methodology

The proposed IAMMS describes the general principles of the system with the main purpose of integrating, maintaining, and supporting monitoring, planning, legislation, research, and study of processes in the seas and oceans for the various strategic needs of Israel. The purpose of this platform is to collect relevant information based on various data sources such as remote sensing, buoys and data processing using Geographic Information System (GIS) methods for efficient and fast spatial and temporal monitoring of Israel's marine environment in the Mediterranean Sea and the Red Sea.

Remote Sensing

Remote sensing is the process of detecting and monitoring objects and their physical characteristics by measuring reflected radiation at a distance (usually from satellites, aircraft, and drones) without any physical contact. An important aspect of remote sensing is the "footprint/spectral signature" of the particular object. By constant monitoring of a certain area with the uses of spectral analysis techniques, it is possible to determine in advance various physical changes of the object even before the human eye can observe these changes. The current number of satellites and their support systems, with daytime time coverage and a high spectral and geometrical resolution, currently monitors a variety of objects, regardless of weather conditions. Organizations such as NASA and the European Space Agency (ESA) provide free

public domain satellites, thereby allowing them to observe and provide results in near real-time.

Sentinel-1

This mission is composed of a constellation of two satellites, Sentinel-1A and Sentinel-1B, which share the same orbital plane. They carry a C-band synthetic-aperture radar instrument that collects data in all kinds of weather, day or night. This instrument has a spatial resolution of down to 5 meters and a swath of up to 400 kilometers.

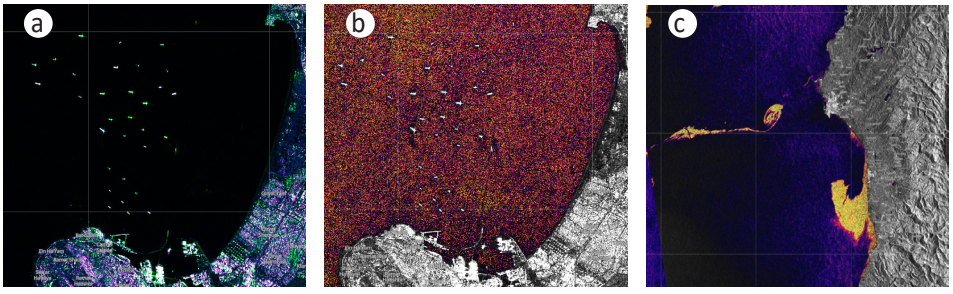

Figure 5: Sentinel-1 images of Haifa Bay (left and center) and detection of the oil spill from the Banias Refinery (Syria) during August–September 2021 (right). The left figure enhances the urban area, center, and right figures by using a mathematical index for the detection of oil spills (right) and algae bloom in Haifa bay (center)

As shown in Figure 5, it is possible to distinguish ships in the port area of Haifa, despite weather conditions. Using mathematical indices (Figure 5 [right]), it is possible to analyze the content of the pollution (oil, algae, etc.) in seawater. With a repetition time of approximately two to three days in Israeli latitudes, Sentinel-1 images allow Israel to perform constant spatial and temporal analysis.

Sentinel-2

The Sentinel-2 satellite carries a single multispectral instrument with thirteen spectral channels in the visible/near-infrared and short wave infrared spectral range.

Within the thirteen bands, Sentinel-2 images provide a wide range of coastal and marine observations. The ten-meter spatial resolution of RGB channels allows object detections with a size larger than ten by ten meters (see Figure 6). Moreover, information gathered in "Infrared" and "Short Wave Infrared" spectrums can be applied in marine environmental monitoring, disaster management, and mapping of human footprint.

Figure 6: Sentinel-2 RGB image of Syrian Tartus port

Sentinel-3

Sentinel-3 is a multi-instrument sensor that focuses on ocean surface topography as well as land and sea surface temperature. The platform carries the Sea and Land Surface Temperature Radiometer (SLSTR), the Ocean and Land Color Instrument (OLCI), as well as a Synthetic Aperture Radar (SAR) and a Microwave Radiometer (MWR).

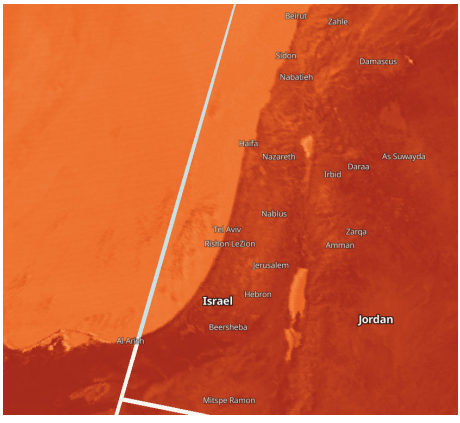

Figure 7: Sentinel-3 provides sea surface temperature globally on daily basis. Spatial resolution is 300 meters per pixel

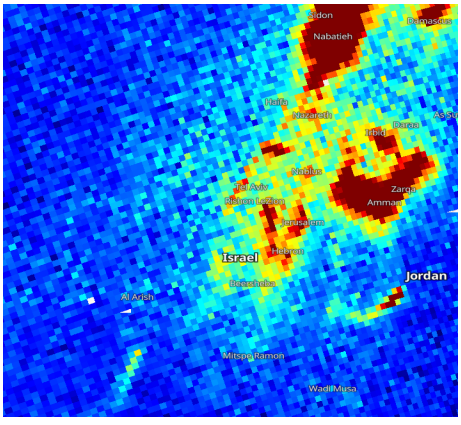

Figure 8: Air pollution (NO_2) over Israel derived from Sentinel-5. Spatial resolution is approximately 5.5 kilometers by 3.5 kilometers per pixel

Sentinel-5

Sentinel-5 is focused on air quality and composition-climate interaction with the main data products being O_3, NO_2, SO_2, HCHO, CHOCHO, and aerosols. Additionally, Sentinel-5 will also deliver quality parameters for CO, CH_4, and stratospheric O_3 with daily global coverage for climate, air quality, and ozone/surface UV applications.

Nighttime Lights

Remote sensing of nighttime lights (NTL) offers a unique ability to monitor human activity from space during the night by measuring low lights. Since the 1990s, many studies have taken advantage of the ability to monitor artificial lights from space and quantify the relationships between human activity and other variables or nighttime brightness, as well as quantify the extent and rate of human activities (see Fig. 8). In the past decade, nighttime light remote sensing images show significant application potential in the marine domain, such as mapping shipping activities (Zhong et al., 2020). The Visible Infrared Imaging Radiometer Suite (VIIRS) instrument is considered to be one of the most popular in the academic field with a spatial resolution of 350 to 750 meters.

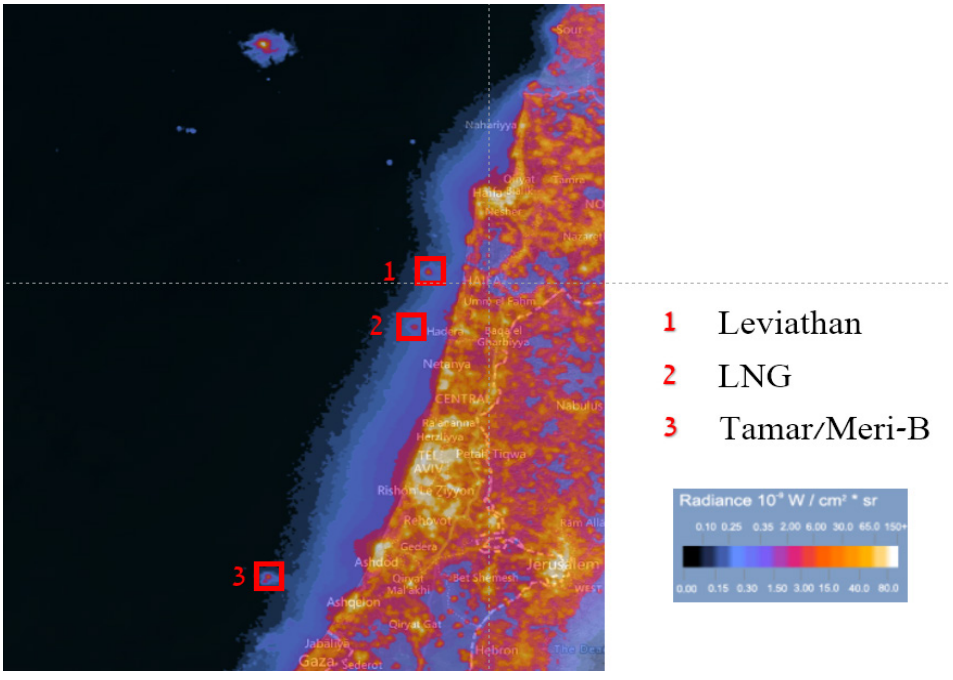

Figure 9: Average NTL over Israel EEZ in the Mediterranean Sea in 2020

As presented in Figure 10, NTL data indicated a stable amount of NTL from 2013 to 2019 and two periods (end of 2018 to end of 2019, middle of 2020 to August 2020) of a significant decrease in the overall sum of NTL produced in the vicinity of the exploded Beirut dock, which points to an attempt to lower the nighttime lighting in the area. Using suitable computer systems and creating logical laws, such changes can be detected in real-time.

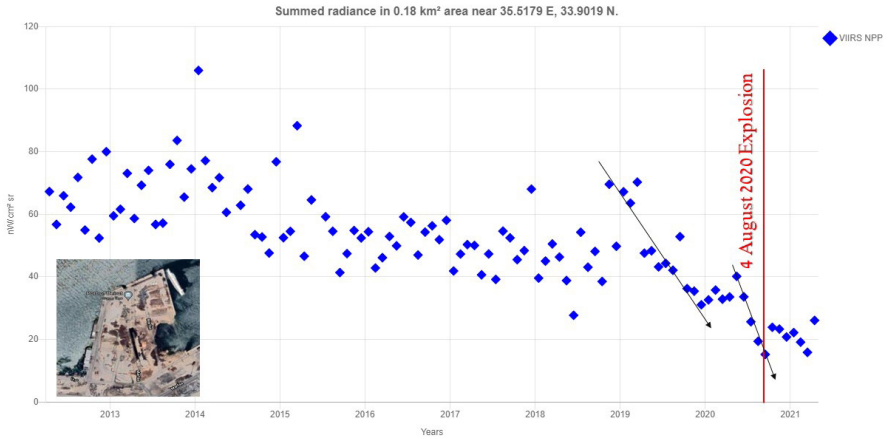

Figure 10: Analysis of NTL values above the explosion on 4 August 2020 Beirut dock, using VIIRS

Automatic Identification System (AIS)

One of the most important technological advances in the maritime industry over the past decade has been the introduction of an Automatic Identification System (AIS). Its tracking system allows—based on the GPS transmitters on the ship—free reporting of the ship's position every five seconds to five minutes. In addition, the signal includes additional information about the age of the vessel, its flag, and other stable and dynamic information. Millions of signals are analyzed using artificial intelligence and other algorithms to detect ship anomalies and avoid collisions and other accidents. The data that can be collected from AIS data can provide a broad overview of various aspects of maritime safety.

Israeli Organizations and Their Datasets

In addition to the widespread free and open access to data provided by NASA, NOAA, ESA, and other organizations, Israeli datasets should also provide free access and be integrated into such a global monitoring systems, primarily for data validation and calibration. For example, the Israeli Coastal and Marine Engineering (CAMERI) and

the Israel Oceanographic and Limnological Research (IOLR) allow limited access to the collected data for local and foreign researchers.

Besides presented datasets in this article, the IAMMS could be fed by additional datasets provided by free access such as Global Monitoring for Environment and Security (Copernicus) and European Marine Observation and Data Network (EMODnet), etc., that provides a wide range of oceanographical, physical, chemical, and biological data.

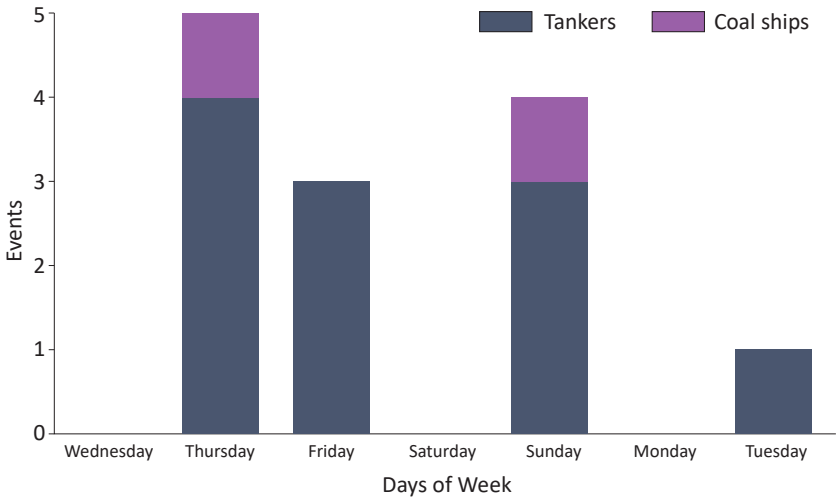

Figure 11: An example of weekly shipping statistics of the Hadera coal power plant and oil tankers in Haifa ports

Conclusion

the last two years have clearly demonstrated the global dependence on navigation. Israel, on the other hand, is in an even more sensitive environment, while it is easy to influence state security from the sea. The oil pollution of Israel's shores in February 2021 highlighted the weaknesses in Israel's maritime security in civil emergencies scenarios. Moreover, the fact that 70% of Israel's drinking water is desalinated water, which leads to a high dependence on access to clean seawater. Therefore, Israel needs to develop an independent open-access database of the Israeli maritime domain that will combine all of the methodologies and data sources: remote sensing, AIS, buoys, and other marine sensors and databases. The current development of remote sensing technologies and computational capabilities will expand the information gathered and analyzed about objects in the sea in real-time, to include

not only the location of the investigated object but also their spatial and temporal signature. GIS technologies will be used as analytical tools to perform such analysis. Such a database must be made available to a wider academic audience for research and will be instrumental in improving Israeli maritime and geostrategic research and the monitoring of deep-sea areas while facilitating the effective response to any type of event, whether it be the result of an accidental (human-made) or natural event. Finally, the findings should be open-access and transparent to international maritime organizations, governments, policymakers, and stakeholders in formulating effective strategies for monitoring the marine environment.

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Estimate of the Cost of Protecting the Sea Ports in Israel Against Cyber Threats[1]

Itai Sela

Introduction

The global economy is dependent on the civil maritime industry to a large extent, not to say completely. The implications of disruption of the supply chain due to cyber attack are not limited to a small number of raw materials-dependent manufacturing sectors; they affect a vast array of consumer products which are dependent on the maritime supply chain.

The weaponization of the cyber space and the increasing involvement of state and non-state players in cyber attacks against critical infrastructures, including the use of private entities and advanced technologies in order to achieve strategic value, make the maritime arena extremely vulnerable. The cyber threat highlights the attacker's advantage and exposes the defender's vulnerabilities. Over the past decade, the civil maritime industry (vessels, passenger ships, shipyards, ports, terminals, and energy infrastructures) has become highly dependent on computer and control systems which are based on operational technology. These systems are mostly based on obsolete operating systems, do not have security updates and patches, have limited (if any) monitoring capabilities, and most of them have no cybersecurity. These technology gaps, the weaknesses caused by the man-machine interface, the reliance on the human factor as a solution for coping with the cyber threat and the reliance on non-binding recommendations, all together make it difficult to analyze the implications and losses actually caused by maritime cyber attacks.

This article analyzes the cyber threat [the act of inserting malware into information technology (hereafter IT) or operational technology (hereafter OT) systems, with the intention of achieving military, intelligence or business objectives] with emphasis on OT systems within the civil maritime industry. It assesses the cost of the threat and the required solution for protecting all of Israel's ports, while recommending a conceptual shift in the cybersecurity of the civil maritime industry.

The main findings in this article indicate that the direct and indirect cost of the cyber threat from a single attack on the four ports in Israel is estimated at an average of

[1] This article is part of my thesis written under the guidance of Prof. Shaul Chorev, Head of the Maritime Strategy & Policy Research Center, The Social Science School International Relations Division, and Dr. Doron Nissani, Business Management School.

approximately $1.7 billion. At the same time, the cost of the solution for that threat according to the proposed 'Inside-Out' cyber defense approach, is estimated at an average of approximately $3.5 million per year, which is less than one quarter of one percent of the cost of the cyber threat itself. Decision-makers called upon to discuss the issue of coping with the cyber threat to the operational systems hesitate to decide as to the investment in cybersecurity for operational systems in their organization due to the complexity, cost and information gaps. However, the intensification of the scope and nature of the cyber attacks on maritime assets in general and on sea ports in particular indicates that the trend is gaining momentum, and that it is becoming more likely that the operational systems of the Israeli sea ports will be attacked in the near future. Therefore, this article reflects the nature of the threat, the defensive concepts and the accounting calculation between the cost of the threat and the cost of the solution, in order to enable decision-makers in Israel (managements and regulators) to assess, from a new perspective, the defensive concept and its cost, against the cost of the threat and the damage which may be incurred as a result of one cyber attack against the sea ports in Israel.

The cyber threat to the civil maritime industry

Over the past decade, industries in general and the maritime industry in particular have become increasingly dependent on OT computer systems serving as a man-machine interface and helping in the management of critical operations. In the civil maritime industry and its components (the shipping sector, ports and terminals sector, shipyards, and energy infrastructures), the operational technology plays significant roles in running critical functions. This technology is based on obsolete, unmonitored operating systems which are not interconnected, and they are dependent on updates and maintenance which is sent from information systems, and which usually do not have cybersecurity. The growing demands made to the maritime industry to increase efficiency and improve the quality of the service it delivers to its customers is totally dependent on the quality of the communication, the logistics, the OT systems and the IT systems, all of which expose the sea ports and the various maritime platforms to cyber attacks, which are on a continual upwards trajectory.[2]

Rid & McBurney (2012) define cyber weapons as malware used to achieve military or intelligence goals as part of a cyber attack. Its appearance has made the maritime industry in general, and the OT systems in particular, more exposed and more

[2] Ido Ben-Moshe and Itai Sela, Maritime Policy & Strategy Research Center, University of Haifa (2020), The cyber threat to the ports front.

vulnerable. In this article, the use of the term 'cyber threat' describes the act of inserting malware into computing systems (OT and IT), with emphasis on the OT systems.

Studies indicate on the one hand that the response to the cyber threat in the maritime arena has been low, that the number of reported attacks does not reflect the actual number of attacks (Jensen, 2015), that the potential inherent to the maritime cyber threat is about to become the most severe business threat in future (Schauer et al, 2017), and the maritime industry is not prepared to cope with these risks in an environment based on modern OT systems (Silgado, 2018).[3] On the other hand, due to understanding of the threat and its potential implications on the world economy, non-binding recommendations have been issued for cyber security in the sea ports and in maritime platforms which are reliant on the human factor. They believe humans are able to successfully cope with the cyber threat and that this is their responsibility. This has been said despite the understanding that human error is the main cause of maritime accidents (Luo & Shin, 2019, Arslan et al., 2016), particularly in an environment rife with technological changes (Pomeroy & Earthy, 2017). This sharpens the gap between the prevailing concept within the industry that still considers the human factor to be the main problem, and the fact that it also singles him out as being responsible for a solution.

In Israel, the government decided in 2011 on "advancing national cyberspace capabilities", and set up the National Cyber Bureau within the Prime Minister's Office.[4] In 2015, the Bureau was renamed National Cyber Directorate,[5] and finally in 2017 it was merged with the National Cybersecurity Authority to form the National Cyber Directorate.[6] In 2015, the government defined the term Cybersecurity as the entirety of the measures intended to prevent, mitigate, investigate and cope with cyber threats and cyber events and to reduce their impact and the damage they cause, prior to their occurrence, while they are occurring and after them. it determined "that protecting the normal, safe functioning of cyberspace is the State's

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3 Silgado, D.M. (2018). *Cyber-attacks: A digital threat reality affecting the maritime industry*. World Maritime University.

4 Prime Minister's Office, Israel (2011). Government decision 3611, Advancement of the National Capability in Cyberspace [Hebrew]

5 Prime Minister's Office, Israel (2015). Government decision 2443, Advancement of National Regulation and Government Cybersecurity Leadership [Hebrew].

6 Prime Minister's Office, Israel (2017). Government Decision 3270, Merging the National Cyber Directorate .

vital national, security goal and a national interest vital to its national security."[7] In 2016 the transfer of responsibility for "vital computerized systems" to the National Cyber Organization was arranged in accordance with the Regulation of Security in Public Entities Law (1998), in which the Directorate is specified as the instructor of various systems and organizations, including maritime companies and infrastructures (Ashdod Port Company, Haifa Port Company and Petroleum & Energy Infrastructures Ltd.).[8]

Operational Technology in the Sea Ports

There are, on average, 332 central OT computerization systems in a sea port, which are based on a variety of vendors, operating systems, and applications. This operational technology serves as an interface linking man and machine, thereby assisting in performing the critical functions. The maritime operational technology is unique in that this technology is based on obsolete operating systems such as Windows XP/7, and most of them nowadays are no longer supported by Microsoft[9] and security updates are no longer released. Most of the OT systems are not permanently connected to external networks, most of them do not have protective and defensive systems installed, such as antivirus, and if such are installed, they are usually out of date, which complicates maintenance and constitutes cybersecurity vulnerabilities.

Figure 1 below presents the deployment of the operational systems in a sea port such as: various cranes such as Rubber Tyred Gantry cranes (RTG), which arrange the containers inside the port grounds, and Ship To Shore cranes (STS), which load and unload containers from ships at an average speed of 26 moves per hour, transport vehicles, the system for routing and managing the maritime picture, breakers, gates and portside vessels. These systems operate on separate networks, which among them use "Ethernet", "Serial" communication and also wireless communication, which transfers data (loading or unloading plans and operation and maintenance instructions) from the port control center (Terminal Operating System – TOS) to a wide range of internal and external port systems.

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7 Prime Minister's Office, Israel (2015). Government decision 2443, Advancement of National Regulation and Government Cybersecurity Leadership [Hebrew]; Prime Minister's Office, Israel (2015). Government decision 2444, Advancement of National Preparedness for Cybersecurity.

8 Israeli Knesset (2017), Center for Research and Information, Regulating the Responsibility for Cybersecurity in the Government and in Public Bodies.

9 Microsoft, Support for Windows XP ended; Microsoft, Support for Windows 7 ended

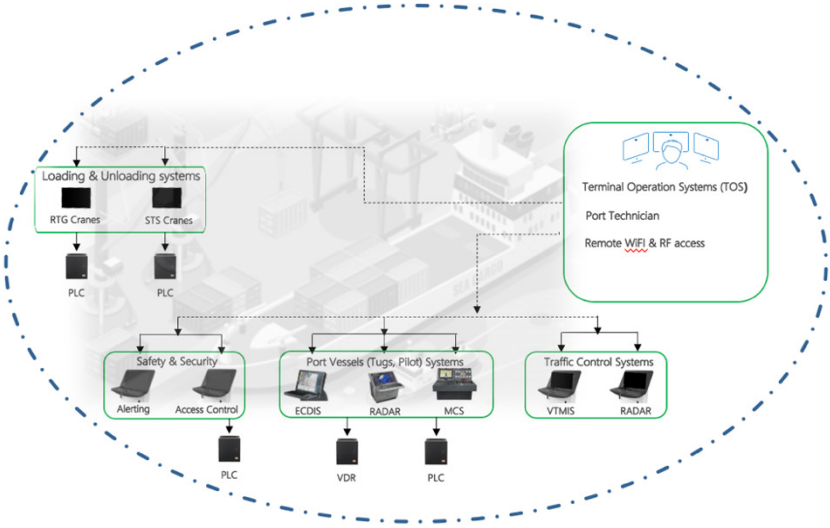

Figure 1: Deployment of main OT systems in a sea port

Operational technology system attack vectors

There are two types of vectors that attackers use to penetrate and damage OT systems in the maritime working environments and particularly in the sea ports. One is the External Attack Vectors. These vectors find the vulnerabilities of the information network, which the attacker exploits in order to insert the attack code from the external information systems into the internal operational technology systems. The attacker does this by using various techniques such as manipulations and deceit. In sea ports, the threat of using an external attack vector in order to harm operational systems is significant because the port has many interfaces with external bodies with different characteristics. In many cases, the information network is connected directly to the Terminal Operating System, which is connected to the operational network. Also, some of the everyday communication with the port operational systems are based on WiFi and RF networks, which are exposed to takeover and abuse as a vector for penetrating the operational network. The second kind of attack vector is the Internal Attack Vector, where users with access rights use the OT systems, such as crew members, technicians and other service providers, who in most cases unwittingly perform routine actions, thereby inserting the attack code from the external information network into the internal network and into the OT systems themselves.

Figure 2 below illustrates the internal attack vectors and the insertion points from the information network into the operational system in the port. For example, the port technicians and the system manufacturers routinely perform remote maintenance of the operational systems via cellular communication, RF and WiFi, or locally on the systems by connecting a computer or detachable memory device (USB). In doing so, they insert the attack code from the IT system into the OT system, which spreads to the rest of the OT systems.

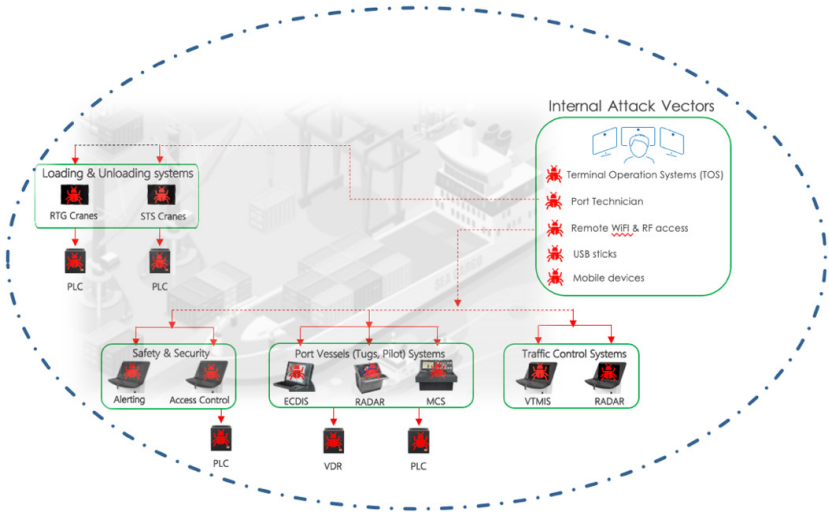

Figure 2: Internal attack Vectors in the port and the spread of the attack to all OT systems

Defense Approaches

In protecting the operational systems in the sea ports, two main approaches can be defined: the 'Outside-In' defense approach (which is now common in sea ports), which defines the external attack vectors as the main threat with which it has to contend, and the 'Inside-Out' defense approach, which provides a protection solution to both the external and internal attack vectors.

The defense approach which is based on '**Outside-In**' technology defines the external attack vectors as the main threat with which it has to contend. In this approach, the coping strategy is similar to installing fences around a secured site. It copes with the cyber threat through the use of a variety of technologies originating from protection of IT systems, such as deployment of a firewall, which prevents entry of unwanted communications into the organizational internal network. Installation of antivirus and disarm systems, which scan files before using them and which issues an alert

to the user upon detection of a malicious file with a recognized signature based on a list which gets updated from time to time. Efficient use of antivirus programs requires a continuous Internet connection, or routine updating of the new malicious file signatures. Without these updates, the effectiveness of the antivirus diminishes considerably. Another technology is network monitoring, which requires sensors to be deployed at various points throughout the network. Its main goal is to detect and alert on irregular network activities. These systems usually require a control center and a human factor to supervise and respond when necessary. This technological concept has several weaknesses: exposure to human error, false alarms, mistaken diagnosis, analyst burnout and a real difficulty in protecting operational systems against the threat of internal attack. These vulnerabilities may lead to a situation where malware succeeds in penetrating the operational network, and from there it can propagate to all of the OT systems. Quite often, these attacks penetrate the OT systems without the users' knowledge, and only months later and at a specific timing will they be activated, causing considerable damage without being able to respond.

A defense approach based on '**Inside-Out**' technology focuses on implementation of an active preventive protection technology in each one of the OT systems throughout the port, thereby delivering a protective solution to both attack vectors (the external and the internal), by implementing protective layers with various capabilities which enable protection, detection and alerting in three dimensions: EXE files, communication, and devices. All of this is done on each one of the OT computerization systems in the port. This approach does not require routine updates, it does not require the users to be trained or to have any pre-existing cyber knowledge, a connection to the Internet or a list of updated malware signatures. It is suitable for protecting both legacy and new systems or whether or not these are connected to the network. It enables the manufacturers and the technical personnel secure remote installation and maintenance, it enables the port operators to present a secure, up-to-date situation status of the cybersecurity on each one of the OT systems and it is therefore more suitable for protecting the OT systems operating in the sea ports.

In fact, the main difference between the two defense approaches is that in the 'Outside-In' approach, if the malware has succeeded in getting past the protection systems (the perimeter fence), it gains access to a large number of OT systems, all interconnected over internal networks and totally unprotected. On the other hand, in the 'Inside-Out' defense approach, the malware has got to attack each and every OT system separately, and even if it succeeds in penetrating one system, the damage is going to be localized only, and the recovery process will be shorter and much

easier. Figure 3 below shows the deployment of the protective software on all of the OT systems in a sea port.

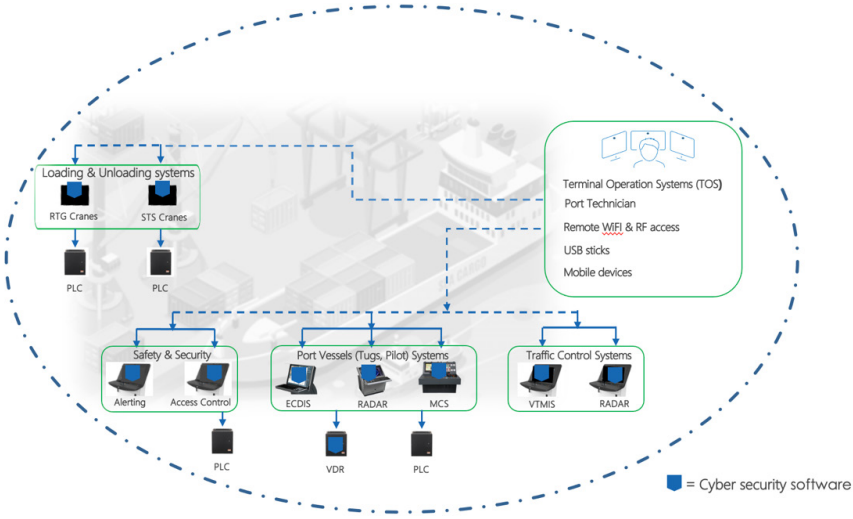

Figure 3: The 'Inside-Out' defense approach in a sea port

Threat cost analysis

A study done at Cambridge University will facilitate the analysis of a cyber threat to the Israeli ports. The study examined the impacts of three cyber attack scenarios on several large ports in the Asia-Pacific region. The researchers estimate that the damage from the worst-case scenario, codenamed "Shen Attack", of a cyber attack against approximately 15 ports in Japan, Malaysia, Singapore, South Korea and China, could incur losses of approximately $109.8 billion.[10] It described an attack through a computer virus which first attacks in a ship, spreads to the ports, and leads to severe disruptions and financial losses through the use of three severity levels, which are felt the world over due to the global connectivity of the maritime supply chain. The researchers estimate that an attack of this magnitude, which affects the sea ports, would inflict significant economic damage to a wide range of businesses due to reduced output and consumption, the costs of the response and the dimension of the supply chain. In a scenario which simulated an attack against nine ports, approximately 1,427,783 TEU were impacted for a period of between four and seven days until complete recovery. The direct financial damage (damage

[10] LLOYD'S (2019), University of Cambridge and Lloyd's, (2019). Shen Attack: Cyber risk in Asia Pacific ports.

to trade and businesses in the countries of the ports due to delays in deliveries) totaled approximately $36.8 billion and the indirect loss (damage to commerce and businesses in the countries with which the affected port has maritime trade relations due to delays in delivery) totaled approximately $19.1 billion, thus the total amount of the damage was approximately $55.9 billion.

The following assessment is based on the scenario of an attack on nine ports which is the more conservative scenario (the amount of financial damage per TEU was the lowest). It can be assumed that the average impact of a delay in the handling of one TEU would be equivalent to direct financial damage of $25.7 thousand (the quotient of $36.8 billion by 1,427,783 TEU), indirect financial damage of approximately $13.3 thousand (the quotient of $19.1 billion divided by 1,427,783 TEU), and to approximately $39.1 thousand (the quotient of $55.9 billion divided by 1,427,783 TEU). Based on these assumptions and referring to a cyber threat as a country-level threat according to the DNV definition (targeted cyber attacks using sophisticated means, abundant resources, good technical capabilities, good knowledge of the systems and a high level of motivation),[11] the damage that can be caused to the four Ports of Israel (Ashdod, Haifa, Israel Shipyards and Eilat) can be estimated. With a GDP of approximately $370.2 billion in 2018,[12] we can calculate the number of TEU's handled in Israel per day (the quotient of 2,940,917 TEU divided by 365 days),[13] we get a result of 8,057 TEU and we multiply by the number of days of the business disruption due to the cyber attack (multiplying 8,057 TEU by four days and seven days) and we get a number equal to 32,228 TEU as a minimum, and 56,399 TEU as a maximum, which were impacted by the cyber attack. To calculate the direct damage, we multiply by $25.7 thousand (the value of the direct damage per TEU unit) and we get the minimum direct damage of $828.2 million, and a maximum direct damage of $1.4 billion. To calculate the indirect damage, we multiply by $13.3 thousand (the value of the indirect damage per TEU unit) and we get the minimum indirect damage of $428.6 million, and a maximum indirect damage of $750.1 million. To calculate the total damage, we multiply by $39.1 thousand (the total value of the damage per TEU unit) and we get the minimum total damage of $1.2 billion, and a maximum total damage of $2.2 billion.

11 IUMI (2018), DNV GL releases first cyber security class notations.

12 The World Bank, UNCTAD, World Bank national accounts data, and OECD National Accounts data files.

13 The World Bank, UNCTAD, Container port traffic.

Response cost analysis

To estimate the cost of the response to the maritime cyber threat, taking into consideration the complexity of estimating the threat cost, the difficulty in proving loss, the appropriateness and the ways of implementing the various solutions, methods were examined for recognizing assets, their value to the organization, the threats, their impact, technological vulnerabilities, the probability and the need to select a risk mitigation strategy.

Jerman-Blažič (2008) compared the cost of the threat to the cost of the response and estimated that the optimal investments in information security is roughly 36.8% of the potential loss emerging from the threat. Srinidhi et al. (2015) point out that managers have incentives to invest more in cyber security than investors, and how cyber insurance minimizes over-investment on the part of managers in specific assets in favor of improving the cyber security. Wang (2019) suggests an innovative insurance model based on cyber threat-adjusted coverage with emphasis on the Risk Assessment sharing in the investment in security.

So far, most of the efforts to deal with the maritime cyber threat in general, and in the sea ports in particular, and to estimate the resulting costs – have focused on the insurance aspects and on monitoring, risk management and training solutions. Less estimation work has been done on solutions based on a technology-based 'Inside-Out' defense approach and on what is the cost of the protection required in order to significantly mitigate the cyber threat on the sea ports.

Table 1: The costs of the solution in US dollars[14]

	Total quantity	Number of operational systems in a single Port	Average operational systems in a single Port	Annual cost of protecting one operational system in US dollars	Annual cost of protecting a single Port in US dollars	Annual cost of protecting all the Ports in US dollars
Sea ports in Israel	4	77–586	332	300–5,500	99.6 thousand 1.82 million	398.4 thousand 7.3 million

Cost comparison: threat versus solution

To help decision-makers in the field of risk management of cyber threats to the sea ports in Israel, table 2 shows the costs of the threat versus the costs of the solution for protecting the sea ports in Israel. The comparison is presented in percentages, and within that taking into consideration the optimal investment in

[14] Proven Data (2020), How Much Does Cyber Security Cost? Common Cyber Security Expenses & Fees.

protection, approximately 36.8 percent of the cost of the cyber threat, as defined by Jerman-Blažič (2008). The table data clearly indicates that the cost of the solution for protecting against the maritime cyber threat to the sea ports in Israel is significantly lower than the definition of the optimal percentage of investment in defense. This is given that the most expensive cost of the protection solution (annual cost of approximately 5,500 dollars for protecting one operational system) for Israel's ports totals approximately 0.88 percent of the cost of the direct threat, and approximately 0.6 percent of the total cost of the threat.

Table 2: Costs of the threat versus costs of the solution

Asset type	Cost of direct threat in US dollars	Total cost of threat in US dollars	Cost of solution per year in US dollars	Difference in percentages versus direct cost of threat per year	Difference in percentages versus overall cost of threat per year	Low cost of direct/ total damage versus high cost of protection in percentage points
Sea ports in Israel (4)	828.2 million 1.4 billion	1.2–2.2 billion	398.4 thousand 7.3 million	0.028–0.88	0.018–0.6	Direct 0.88 Overall 0.6

Conclusion and Insights

As a consequence of the technological development in sea ports, the connectivity, threat complexity and the strategic importance of the sea ports to the State of Israel's security and economy, decision-makers (port managements and regulators) should evaluate the existing cybersecurity approaches and their costs.

The findings of the calculated analysis indicate that the cost of the solution to the threat of one cyber attack on Israel's four sea ports is less than a quarter of one percent of the cost of the threat itself. In view of this, it is advised to consider adopting the 'Inside-Out' defense approach through implementation of multi-layered cybersecurity solutions, which are compliant with the protection standards against a state-level threat, thereby enabling the sea ports in Israel to mitigate the security gaps. At the same time, state incentives must be created, the regulation has to be adapted and the responsibility for coping with the cyber threat to the sea ports' operational technology systems must be shifted from the human factor to active technological solutions.

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Government Subsidies for the Maritime Sector Around the World: Commercial Shipping, Efficiency and Improved Productivity, Shipyards, Air Pollution, Research and Development, etc.[1]

Ofir Kafri

Introduction

Countries around the world help their maritime sector through subsidies.[2] This assistance is given in areas like infrastructure, research and development, air pollution, manpower, energy, and shipping. Subsidies serve to advance goals such as the ability to compete in the international system, prevention of environmental pollution, and maintenance of a maritime fleet for periods of national emergency. Countries employ a variety of subsidies such as tax breaks, easing of payments and extending credit under favorable terms. Experience from around the world shows that subsidies can help advance political aims but there are also cases of failures and damage.

This article presents subsidies in several fields within the maritime sector, which are in use around the world. The article will not go into details on tax benefits, which are discussed in an article in the Maritime Strategic Evaluation for Israel 2020/21.[3] The article presents ways in which subsidies are applied and several advantages and disadvantages that have been identified due to their use in the various countries. Due to the limited scope of this article, it does not cover all of the fields of the maritime sector, nor does it cover all of the pros and cons of applying subsidies. The article presents examples for the use of subsidies in countries such as the United States, China, Sweden, South Korea and Singapore. Finally, conclusions will be presented which may serve Israel, should it come to decide on the use of such tools.

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1 This article is not to be considered as consulting, legal or other and should not be used for any purpose beyond its academic purpose. Due to the scope limitation the article does not contain all the issues and complexities of the presented subjects.

2 There are various definitions for the term subsidy. There are also several ways to categorize subsidies. For further reading: G. Schwartz & B. Clements "Government subsidies," *Journal of Economic Surveys*, 13(2) (1999), 119–148; European parliament. Directorate general for internal policies. Global Fisheries Subsidies, 2013, p. 21; P. J. Barwick, M. Kalouptsidi & N. B. Zahur, *Industrial policy implementation: Empirical evidence from China's shipbuilding industry*. Working paper, Cornell University and Harvard University, 2021.

3 Ofir Kafri, "Tax Benefits under Special Tax Regimes for the Shipping Industry," In Shaul Chorev and Ehud Gonen (eds.), *Maritime Strategic Evaluation for Israel 2020/21* (Haifa: Maritime Policy & strategy Research Center, University of Haifa, 2021), pp. 326–335.

Subsidies in various fields of the maritime sector

Subsidies for shipyards and for shipbuilding in local shipyards

Subsidies for the shipping sector and for shipbuilding are given by various countries such as China, South Korea, and the United States.[4] Subsidies are given for various matters in shipyards, such as labor costs, infrastructure development, and technology application. Examination of test cases around the world shows that while subsidies in the shipyards industry can have undesirable consequences, certain subsidies succeed even if sometimes temporarily.[5]

China employed various subsidies to support its shipyard industry in areas such as production, investment and infrastructure.[6] China has succeeded in increasing its share of the global shipbuilding market, among other things, thanks to the government assistance policy.[7] It is important to note that while some of the subsidies were successful, others were unhelpful and even distorted the sector.[8] An example of a subsidy that was implemented is the Scrap and build subsidy scheme, for which new ships were ordered from Chinese shipyards. The official goal of the program

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4 See for example the China case study: Center for Strategic and International Studies. Hidden Harbors: China's State-backed Shipping Industry. July 8, 2020.

5 OECD. (2017). Imbalances in the Shipbuilding Industry and Assessment of Policy Responses. OECD Publishing, Paris, pp. 22–68.

6 For further reading on subsidies and the development of the shipbuilding industry in China, see the following sources: OECD. (2021). Report on China's shipbuilding industry and policies affecting it. OECD Science, Technology and Industry Policy Papers No. 105. OECD Publishing, Paris; L. C. Lee Daniel and P. Parmentier. (2021). State-owned enterprises in the shipbuilding sector. OECD Science, Technology and Industry Policy Papers, No. 98. OECD Publishing, Paris.

7 Beyond subsidies, the success in enlarging the shipbuilding industry in China is attributed to additional reasons, such as relatively low manpower costs and setting up shipyard groups. For more elaboration: M. Kamola-Cieślik (2021). Changes in the Global Shipbuilding Industry on the Examples of Selected States Worldwide in the 21st Century. *European Research Studies*, 24(2B), 98–112.

8 In the Chinese case, subsidies that helped lower production costs and increased investment were more successful. Furthermore, subsidies which were focused on efficient companies were more successful than subsidies which were given to all of the companies in the industry. Subsidies which were intended to bring new players into the sector were considered less successful. To a certain extent, subsidies caused overcapacity in the shipbuilding industry. This overcapacity was exacerbated during periods of low demand for ships. For more elaboration: P. J. Barwick, M. Kalouptsidi, & N. B. Zahur (2021). Industrial policy implementation: Empirical evidence from China's shipbuilding industry. Working paper, Cornell University and Harvard University.

was to have old, polluting ships scrapped, to increase business in the shipyards and to strengthen the sector.[9]

Another example is Japan, which provided subsidies, among other things, for training and temporary transfer of manpower from the shipyard industry to other sectors due to downsizing.[10] In the Swedish case, subsidies were provided for the shipyard industry in the past, when it was experiencing difficulties. For example, support was provided for research and development, for purchasing of ships, etc. The purpose of the subsidies was to help cope with a slump in orders and thus prevent unemployment and the collapse of the shipyards. The subsidies were discontinued in 1985 due to increasing costs and economic unfeasibility. Despite the subsidies, there was a decline in shipbuilding capacity in the early 1980s. The sector, which suffered from competitive difficulties, shrank considerably after the subsidies were discontinued.[11]

In the United States, the Merchant Marine Act of 1936 created a subsidy which addresses the building of ships of certain kinds in local shipyards – Construction Differential Subsidy (CDS) – which was applied until 1983.[12] One of the goals of the subsidy was to help shipyards in the United States through paying part of the price difference for building ships in local shipyards compared with competitors in other countries.[13]

Government publications claimed that the subsidy is one of the drivers of distortions in the shipbuilding industry. The shipyards had been suffering, among other things, from problems in their managerial innovation and streamlining, and

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9 M. Kalouptsidi, (2018). Detection and impact of industrial subsidies: The case of Chinese shipbuilding. *The Review of Economic Studies*, 85(2), 1111–1158.

10 The shipbuilding industry manpower headcount in Japan shrank from 185,000 in 1980 to 91,000 in 2008. For further reading on the shipbuilding industry in Japan: OECD. (2016). Peer Review of the Japanese Shipbuilding Industry. OECD Publishing, Paris.

11 OECD. (2017). Imbalances in the Shipbuilding Industry and Assessment of Policy Responses. OECD Publishing, Paris, pp. 44, 50, 56–57; B. Carlsson, Industrial subsidies in Sweden: macro-economic effects and an international comparison, *The Journal of Industrial Economics* 32(1) (1983), pp. 1–23.

12 For further reading about the subsidy and its impact on the economy and on the shipbuilding sector in the United States: U.S Congressional Budget Office. U.S. Shipping and Shipbuilding: Trends and Policy Choices. 1984, pp. 101–107.

13 U.S. Department of Transportation. Maritime Administration. The Maritime Administration's First 100 Years: 1916–2016. Last updated: March 25, 2019; R. C. Moyer (1977). Maritime subsidies: problems, alternatives and tradeoffs. *The Journal of Industrial Economics*, pp. 53–68.

the subsidies perpetuated and even exacerbated these problems, to a certain extent. A government report recommended that future subsidies focus on the problems which had impacted the shipyards' competitiveness, such as faulty efficiency and obsolete infrastructures.[14] Nowadays, shipyards receive grants for improving efficiency, competitiveness and quality of work, as well as for training and manpower improvement.[15] In addition, under the Federal Ship Financing Program (Title XI), credit guarantees are given for the shipbuilding in the United States and for improving the infrastructures in the shipyards.[16]

Subsidies for commercial shipping

Some countries provide subsidies for owners and operators of ships of various kinds, for operating the craft, for buying and selling of tools, repairs, etc. The subsidies are given in various forms such as credit under preferred terms, guarantees, tax benefits, grants and reduction of compulsory payments.[17] In addition, subsidies are given by the purchase of shares, service provision agreements, debt write-offs etc.

For example, China finances upgrading of Chinese-owned shipping companies through a variety of subsidy programs like grants and loans under preferred terms.[18] Other countries, for example Japan, give loans under favorable terms to shipping companies from state-owned banks. In addition, countries like Spain and France grant, under certain conditions, state guarantees for credit extended to shipping companies.[19]

Another example is the United States, which provided assistance in financing operating expenses of local shipping companies which met certain conditions. The subsidy was called Operating Differential Subsidy (ODS).[20] The assistance was

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14 U.S. Congress. Office of Technology Assessment. An Assessment of Maritime Technology and Trade. Washington, D.C.: OTA-O-220. October 1983, pp. 85–116.

15 U.S. federal register. journal of the federal government of the United States. Small Shipyard Grant Program; Application Deadlines. A Notice by the Maritime Administration on October 1, 2021.

16 U.S. Federal Ship Financing Program (Title XI). Last updated: October 6, 2020.

17 See for example subsidies which are given in the form of tax benefits for the shipbuilding industry worldwide: O. M. Merk (2020). Quantifying tax subsidies to shipping. Maritime Economics & Logistics, 22(4), 517–535.

18 *Reuters*. China gives 4 shipping lines $293 mln to upgrade fleets. September 30, 2014; COSCO Shipping Holdings. Annual report. 2020.

19 International Transport Forum Policy Papers. 2020. Maritime Subsidies Do They provide Value for Money? *OECD*, pp. 24–25.

20 U.S Maritime Administration. The Maritime Administration's First 100 Years: 1916–2016. Last updated: March 25, 2019.

intended to make the operating costs of United States shipping companies equal to those of other countries, whose costs were lower. The payments were given for wages, insurance and other expenses.[21]

Another example is South Korea, which in 2018 established a body called KOBC (Korea Ocean Business Corporation), which provides subsidies to shipping companies and other entities in the maritime sector.[22] It was established as part of a multi-year plan intended to deal with problems in the maritime sector, such as the reduced competitiveness and a growing technological disparity. The plan is part of a strategy intended to turn South Korea into a leading power in the global maritime sector by 2030.[23] Until the end of 2020, KOBC helped companies in the maritime sector with a total of 5 trillion South Korean Won.[24] It provides assistance and services, such as guarantees for investments, acquisition and operating vessels under preferred terms for the shipping companies, and acquisition and mediating shares of shipping companies. In addition, it invests in maritime infrastructures around the world in order to, among other things, reduce the costs of the shipping industry.[25]

Manpower subsidies

Certain countries like Norway, Germany, South Korea, and Israel provide subsidies related to manpower in the maritime sector. In some of the countries, the subsidies are given due to a decline in the use of local manpower in shipping.[26] This, among

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21 G. McCalley (1978). Approval of Operating-Differential Subsidies under Section 605 (c) of the Merchant Marine Act of 1936: A New Standard for "Adequacy". *Duke Law Journal*, 1978(1), 252–270.

22 Korea Ministry of Oceans and Fisheries. Strategy to Become a Global Leader in Shipping. June 29, 2021.

23 According to the South Korean government, the program is successful and there is an improvement in certain parameters of the maritime sector, such as revenues from shipping. It should be noted that there are other factors, such as favorable conditions for business in the global maritime industry, which affect the improvement trend besides the multi-year plan and the activity of the KOBC. Therefore, the extent to which the subsidies have had an effect is currently unclear. For further reading on the strategy for development of the maritime sector, milestones and success indices of the program: Korea Ministry of Oceans and Fisheries. Sectoral Policies. Backgrounds-Strategies for Becoming a Shipping Powerhouse.

24 Fitch Ratings. Fitch Assigns Korea Ocean Business Corporation's First-Time 'AA-' IDR; Outlook Stable. March 30, 2021.

25 Korea Ocean Business Corporation. Management Strategy. 2018.

26 In the case of Britain, difficulties arose due to the use of a tonnage tax to deal with the drop in the use of local manpower in shipping. For more elaboration cn the following sources: V. Gekara (2010). "The stamp of neoliberalism on the UK tonnage tax and the implications for British

other things, is due to competition with lower-cost manpower from other countries such as the Philippines.

The subsidies are given in areas such as financing wages, assistance in training and studies and funding insurance. The assistance is provided, among other things, in the form of grants and tax benefits.[27] For example, in Singapore there is an MCF-Manpower program which provides subsidies for training and improvement of manpower. Assistance is also given to improving the human resources management.[28] Another example is the United Kingdom, which provides a program of assisting the funding of training for maritime positions, named SMarT (Support for Maritime Training).[29]

Subsidies for improving efficiency and increasing productivity

Subsidies for improving efficiency are offered by several countries. For example, Singapore offers several programs for improving productivity and efficiency – for example the MCF-Productivity program. This program provides assistance for the adoption of technologies, as well as for improving work processes.[30]

Research and development subsidies

Subsidies for research and development are granted in various areas such as ship propulsion technologies, hardware and software in information systems, information gathering sensors and pollution reduction systems. Countries such as France, the United States, Germany and the United Kingdom provide subsidies for research in the maritime domain.[31] For example, the MINT-RD program in Singapore, which provides subsidies for development of technologies in the maritime industry and their implementation.[32] Another example is the European Union, which provides subsidies for research in a variety of areas within the maritime domain.[33]

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seafaring", *Marine Policy* 34, pp. 487–494; H. Leggate and J. McConville (2005). "Tonnage tax: is it working?", *Maritime Policy* & Management, Vol. 32(2), pp. 177–186.

27 Maritime Subsidies Do They provide Value for Money? pp. 13–14, 20.

28 Maritime and Port Authority of Singapore. Maritime Cluster Fund (MCF). Last Updated: July 1, 2021.

29 U.K Maritime and Coastguard Agency. Support for maritime training (SMarT). Last updated: July 1, 2021.

30 Maritime Cluster Fund (MCF).

31 Maritime Subsidies Do They provide Value for Money? p. 16.

32 Maritime and Port Authority of Singapore. Maritime Innovation and Technology (MINT) Fund. Last Updated: 5 April 2021.

33 European Commission. Funding & Tenders portal. European Maritime and Fisheries Fund (EMFF).

Development of maritime shipping lanes

Subsidies for developing shipping lanes are intended to assist, among other things, in the reduction of pressure on overland transport infrastructure, reducing air pollution and creating new transport routes. For example, the United States provides grants for development of infrastructure for local shipping lanes.[34] The European Union offers grants for development of maritime transport routes such as the assistance program of the CINEA (European Climate, Infrastructure and Environment Executive Agency).[35]

Subsidies for development and improvement of port infrastructure

Countries help improve and develop ports by various means, including grants and loans. For example, in the United States, the PIDP (Port Infrastructure Development Program) allocates grants on a competitive basis for improving infrastructure for transferring goods through ports, specifically for achieving objectives such as improving safety, efficiency, and for reducing the effects of climate change.[36] Another example is the European Union, which offers subsidies for development of ports as part of several initiatives such as the European Regional Development Fund (ERDF).[37]

Subsidies for preserving a civilian fleet for times of war or for national emergencies

In the United States, the MSP (Maritime Security Program) pays civilian shipping companies to place ships and maritime infrastructures at the disposal of the Department of Defense (DOD) in case of an emergency.[38] The United States pays for a certain number of civilian ships, which have been selected to be available upon demand. Civilian merchant vessels of various kinds are selected for this program. The vessels are registered in the United States, are engaged in international trade and are suitable for the needs of military transport. In addition, the program gives the Department of Defense access to maritime transport infrastructures such as terminals and other facilities, logistics management services and manpower.[39]

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34 U.S Maritime Administration. America's Marine Highway. Last updated: September 3, 2021.

35 European Commission. Maritime – Projects by transport mode.

36 U.S. Maritime Administration. About Port Infrastructure Development Grants. Last updated: April 21, 2021. https://www.maritime.dot.gov/PIDPgrants

37 European Commission. Maritime Ports. Last update: September 26, 2021.

38 U.S. Department of Homeland Security. United States Coast Guard. Flag State Control Division (CG-CVC-4). Maritime Security Program.

39 U.S. Department of transportation. Maritime Administration. Maritime Security Program (MSP). Last updated: February 4, 2021; U.S.A Federal Register. Daily Journal of the United States

Subsidies for reducing air pollution

Air pollution due to shipping and port activities worldwide causes considerable harm to the health of the population and the environment. Its effect on climate change is expected to increase in the future with the expected increase in pollution from shipping.[40] Studies show that air pollution from shipping around the world has resulted in death, disability and chronic harm to health.[41] Israel's ports, particularly the Haifa Port area, suffer from severe air pollution due to the activities in the ports and the shipping.[42]

Air pollution due to shipping activity is currently being discussed internationally. Attempts to reduce the air pollution are being done at the international level, in some of the countries and in some of the shipping companies and in the ports.[43] Subsidies are another tool that can in certain cases help in this area, in addition to regulation.[44]

There are countries which are planning or are working to provide subsidies for reducing air pollution from shipping, among them Germany, Singapore, the United

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Government. Maritime Security Program. 12.01.2017; U.S.A Congressional Research Service. U.S. Maritime Administration (MARAD) Shipping and Shipbuilding Support Programs. January 8, 2021.

40 According to an estimated forecast, maritime shipping's share in gas emissions, such as carbon dioxide, is set to increase from 2,2% in 2012 to around 17% of the global gas emissions in 2050; D. Heine & S. Gäde (2018). Unilaterally removing implicit subsidies for maritime fuels. *International Economics and Economic Policy*, 15(2), 523–545.

41 V. Eyring, I. S. Isaksen, T. Berntsen, W. J. Collins, J. J. Corbett, O. Endresen, ... & D. S. Stevenson (2010). Transport impacts on atmosphere and climate: *Shipping. Atmospheric Environment*, 44(37), 4735–4771; V. Eyring, J. J. Corbett, D. S. Lee, & J. J. Winebrake (2007). Brief summary of the impact of ship emissions on atmospheric composition, climate, and human health. Document submitted to the Health and Environment sub-group of the International Maritime Organization, 6.

42 Israel. Ministry of Environmental Protection. Feasibility study conducted with Ministry of Environmental Protection funding: Ships in the ports of Ashdod and Haifa create severe NOx and SOx air pollution. 28.11.2019; State Comptroller. Special Comptroller Report Aspects of government measures regarding environmental pollution in the Haifa Bay. June 2019.

43 Examples of attempts to reduce shipping air pollution: S. Gössling, C. Meyer-Habighorst & A. Humpe (2021). A global review of marine air pollution policies, their scope and effectiveness. Ocean & Coastal Management, 212, 105824; International Maritime Organization. IMO's work to cut GHG emissions from ships; T. Lee & H. Nam (2017). A study on green shipping in major countries: in the view of shipyards, shipping companies, ports, and policies. *The Asian Journal of Shipping and Logistics*, 33(4), 253–262.

44 Voluntary measures taken by ship owners and ports, which are reliant solely on subsidies without regulation are sometimes insufficient. Due to the dire consequences to public health, it has been claimed that it would be better to combine these two tools in order to achieve a better-optimized outcome.

Kingdom, South Korea and Norway.[45] Such subsidies are given to ships, ports and other entities. The assistance includes benefits in port fees, taxes, registration costs in the shipping register, implementation of cleaner technology, and services provided to ships which meet certain criteria. In addition, subsidies are given for scrapping old ships and building less-polluting ones, etc.[46]

For example, in order to reduce pollution from shipping activities, the New York and New Jersey Port Authority runs the Clean Vessel Incentive (CVI) and in Singapore there is a Green Ship Programme.[47] Another example is countries like Denmark, Sweden and Netherlands, where discounts are given on port payments and services related to air pollution reduction.[48] Yet another example is countries like the United Kingdom, which provide subsidies for research and development intended to reduce shipping pollution.[49] The European Union helps in funding testing of possibilities for improving port infrastructures in favor of reducing air pollution.[50]

Subsidies for fuel and energy

Subsidies are given for polluting fuels which are in use in shipping, and sometimes a tax exemption is given on the outcome of the pollution from these fuels.[51] For

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45 See for example, programs in Singapore, the United Kingdom, South Korea and Norway in this field: Singapore. Maritime green initiative. 2021; U.K Department for Transport. Clean maritime plane. 2019; Norwegian Ministry of Climate and Environment. The Government's action plan for green shipping. 2019; Korea Ministry of Oceans and Fisheries. Sectoral Policies – Shipping Ports Maritime Affairs. "2030 Greenship-K Promotion Strategy" to Dominate the Global Green Ship Market.

46 For further reading on the advantages and disadvantages of using policy tools such as subsidies in dealing with air pollution from shipping: P. Balcombe, J. Brierley, C. Lewis, L. Skatvedt, J. Speirs, A. Hawkes, & I. Staffell (2019). How to decarbonise international shipping: Options for fuels, technologies and policies. Energy conversion and management, 182, 72–88.

47 Subsidies for reducing air pollution from shipping, which are given in Singapore and in New York: Maritime and Port Authority of Singapore. Extension of the Green Ship Programme under the Maritime Singapore Green Initiative. Shipping Circulars No. 12 of 2019; Port Authority of New York and New Jersey. Clean Vessel Incentive Program.

48 Finnish Transport and Communications Agency. Economic incentives to promote environmentally friendly maritime transport in the Baltic Sea region. May 11, 2020, pp. 80–83.

49 U.K Department of Transport. £20 million fund to propel green shipbuilding launched. March 22, 2021.

50 For example, subsidies from the European Union for funding an activity in Barcelona port in Spain, which is intended to test technologies for air pollution reduction: World Ports Sustainability Program (WPSP). Port of Barcelona implements alternative fuel use to improve air quality. January 28, 2019.

51 For more information on fossil fuel subsidies in various countries, see the following database: OECD. Fossil fuel support data and Country Notes.

example, Italy, Portugal, Australia and Greece exempt certain types of shipping activities from paying excise tax on fuels. Countries such as Sweden and Finland exempt local commercial shipping from an energy tax. These subsidies make it difficult to transition to less-polluting fuels and sometimes create the conditions for less efficient and economical use of polluting fuels.[52]

Many countries provide subsidies on the use of cleaner energy from shipping activity. The subsidies are supposed, among other things, to help narrow the gap between the costs of regular, polluting fuels which are cheaper, and less-polluting energy. For example, Sweden subsidizes the use of electricity from a land-based infrastructure by hoteling ships in order to reduce air pollution. Another example is the European Union, which has been involved in funding electricity-powered ferries. Recharging infrastructure were built for the ferries in two ports in Sweden and Denmark.[53] These subsidies are intended to reduce the severe health damage caused to the population due to shipping air pollution.[54]

Subsidies for fishing vessels

China, the United States, South Korea, the European Union countries and many other countries offer government subsidies in the fishing shipping industry.[55] The global subsidies of the fishing sector total $35.4 billion in 2018 terms.[56] Subsidies are given for acquisition and building of vessels, vessel repairs and manpower costs. Additional assistance is given – for example purchasing of surplus fishing products, improving port infrastructures and the logistics chain in the sector and funding of research. Studies and reports from international organizations have claimed that certain fishing subsidies have led to overfishing, which has been harmful to the marine environment and to the fishing industry.[57] As a result, in some cases,

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52 For further reading on energy subsidies: Maritime Subsidies Do They provide Value for Money? pp. 22–23, 32–33, 45–46, 59–60.

53 OECD. ITF. Decarbonising Maritime Transport. The Case of Sweden. 2018.

54 J. J. Corbett, J. J. Winebrake, E. H. Green, P. Kasibhatla, V. Eyring, & A. Lauer (2007). Mortality from ship emissions: a global assessment. Environmental science & technology, 41(24), 8512–8518.

55 For further reading on fishing subsidies in various countries: W. E. Schrank, & U. Wijkström (2003). Introducing fisheries subsidies. Rome: Food and Agriculture Organization of the United Nations.

56 U. R. Sumaila, N. Ebrahim, A. Schuhbauer, D. Skerritt, Y. Li, H. S. Kim, ... & D. Pauly (2019). Updated estimates and analysis of global fisheries subsidies. Marine Policy, 109, 103695.

57 OECD Review of Fisheries 2020. OECD Publishing, Paris.

countries have given subsidies to reduce fishing.[58] Currently there is an international effort in place regarding fishing subsidies, where one of its goals is the prevention of further damage to fisheries around the world.[59]

Advantages of using subsidies in the maritime sector

There are several advantages to using subsidies in the maritime sector.[60] The following advantages are a partial list, resulting from experience gained worldwide:

1. Subsidies can help advance state goals in the maritime sector which would otherwise have been difficult to achieve. Sometimes a state has to intervene, in the absence of any other interested party, or in the absence of ability to advance certain goals which are in the national interest.
2. In certain cases, subsidies can help solve an economic, structural or other failure in the maritime sector. This is due to the fact that in some cases there is an interest, in the maritime sector, to maintain the current state or there is no sufficient incentive to alter the state in the private sector.
3. In some cases, subsidies help retain and develop international competitive capability in the shipping sector.
4. Subsidies can improve efficiency, output and innovation in the maritime sector if they are planned and implemented correctly and optimally.
5. Subsidies can help advance areas in which the process sometimes has an inherent financial risk, such as long-term and/or costly research and development.

Failures in the use of subsidies in the maritime sector

1. A situation may arise in which organizations which receive subsidies will benefit from an advantage over competitors and, as a consequence, the market will suffer from distortion and competition will be negatively affected. It has been claimed that in some cases this happened in the fishing industry.[61] In other cases,

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58 Martini, R. and J. Innes. (2018). Relative Effects of Fisheries Support Policies. OECD Food, Agriculture and Fisheries Papers, No. 115. OECD Publishing, Paris; European parliament. Directorate general for internal policies. Global Fisheries Subsidies. 2013.

59 World Trade Organization (WTO). Factsheet: Negotiations on fisheries subsidies.

60 For further reading on the advantages of using subsidies: M. B. J. Clements, M. G. Schwartz, & R. Hugounenq (1995). Government subsidies: concepts, international trends, and reform options. International Monetary Fund, pp. 6–8; WTO. World Trade Report. Exploring the links between subsidies, trade, and the WTO. 2006.

61 European parliament. Directorate general for internal policies. Global Fisheries Subsidies. 2013, p. 13.

a tonnage tax, which included also onshore facilities like terminals, distorted the competition.[62]

2. There are cases where subsidies do not create the right conditions for achieving the planned outcome.[63] This may result in the subsidy becoming a state expense devoid of any benefit. These cases are caused by various factors, such as mistaken planning and application of the subsidy. In some cases, countries do not recognize failed subsidies due to the lack of impact studies after they have come into use.[64] An example of such a failure is the case of a subsidy in China, which was intended to encourage re-registration under the state flag of ships which had moved to foreign shipping registries. In this case, China offered marginal benefits, which did not amount to an incentive to reregister and the plan failed.[65]
3. High levels of investment or complexity of the process of receiving the subsidy sometimes constitute an obstruction, which prevents the optimal application of the subsidy.
4. Subsidies can in certain cases be detrimental to processes of restructuring and innovation, as well as being detrimental to good quality management. Subsidies can sometimes introduce a distortion in the market, which then discourages attempts for improving services because the revenues or the profit are guaranteed. An example of this is subsidies which were given in the past in the shipbuilding industry in the United States, which had been suffering from efficiency problems, problematic management and outdated infrastructure.[66]
5. Subsidies, which had not been properly analyzed or designed, taking into consideration their potential impacts, can lead to erroneous results and even be

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62 Maritime Subsidies Do They provide Value for Money?

63 Finnish Transport and Communications Agency. Economic incentives to promote environmentally friendly maritime transport in the Baltic Sea region. 11 May 2020, pp. 63–65.

64 A study of the ITF and OECD claims that countries rarely conduct annual impact studies on maritime subsidies. In addition, the study criticizes the quality of the studies in this field, which have been made public. For further reading: Maritime Subsidies Do They provide Value for Money? pp. 34–36.

65 China gave incentives under the STFSR (special tax-free ship registration) policy, which were intended to attract the Chinese shipping back to the Chinese register after they had moved to flags of convenience. The plan failed due to bureaucratic obstructions and insufficient incentives. For more elaboration: J. Chen, K. Li, X. Liu, & H. Li (2017). The development of ship registration policy in China: Response to flags of convenience. *Marine Policy*, 83, 22–28.

66 U.S. Congress, Office of Technology Assessment. An Assessment of Maritime Technology and Trade. Washington, D.C.: U.S., OTA-O-220. October 1983.

harmful.[67] For example, subsidies which spurred growth in fishing fleets and in fishing activity were among the causes for harm to the sustainability of fisheries in certain areas of the world and, later on, to a shrinking of the sector in several countries.[68]

6. Domestic and external processes can influence the results of subsidies given in the maritime sector in a given country. Certain areas in the maritime sector are sometimes influenced by events in other sectors of the state's economy and by developments in the international system. As a result, subsidies might fail and become harmful. For example, there is a cyclic process in the global shipyard industry, which leads to fluctuations in the demand for certain kinds of vessels. As a result, subsidies, which are given to increase shipyard business, can be less successful in times of decline in global demand.[69]

Analysis and conclusion

Subsidies in the maritime sector can be an important, efficient tool for Israel in order to achieve its goals. The experience in application of subsidies worldwide shows that properly-planned application, focused and optimal use of this tool can help advance issues which are in the national interest. At the same time, subsidies which have been specified, planned and implemented wrongly can be harmful and cause resources to be wasted.

Following are some conclusions from the use of subsidies in the maritime sector in various countries. These conclusions are not a comprehensive listing of all of the experience in the field around the world, but they can serve as a source that will be helpful for decision-making in this field in Israel:

1. The purposes of providing the subsidy must be specified in order to be able to optimally plan and implement the tools which will be used. This way it will also be possible to assess the success of the subsidy and to make adjustments if necessary.

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67 Sometimes there are unforeseen consequences to the use of subsidies. M. B. J. Clements, M. G. Schwartz, & R. Hugounenq (1995). Government subsidies: concepts, international trends, and reform options. International Monetary Fund.

68 Patrick, L. (2010). OECD Insights. Fisheries While Stocks Last? OECD Publishing; OECD Review of Fisheries 2020. OECD Publishing, Paris.

69 C. Ferrari, M. Marchese, & A. Tei. (2018). Shipbuilding and economic cycles: a non-linear econometric approach. Maritime Business Review; OECD. (2017). Imbalances in the Shipbuilding Industry and Assessment of Policy Responses. C/WP6(2016)6/FINAL. OECD Publishing. Paris.

2. To the extent possible, a subsidy is supposed to deal directly and pointedly with a specific issue. It is better not to use a sweeping benefit with the intention that perhaps part of it will trickle down and help achieve the goal. Sweeping subsidies which do not directly, pointedly address the problem sometimes have undesired consequences, cause inefficient expenditure of resources and introduce distortions in the marketplace.
3. Before implementation, it is advisable to identify the subsidy's effects, including on other sectors. In the course of implementing the subsidy, effects which had not been identified from the outset have to be examined and adjustments to the subsidy need to be made accordingly.
4. The optimal, most effective type and aspect of the subsidy need to be identified and implemented. For this, it is advisable to carry out an early examination of the characteristics of the problem, the impacts on the domestic market and on the international market and so forth.
5. It is recommended that all of the possible options be explored, in addition to the subsidies, in order to match the optimal tool for the issue we are working to address. Additionally, the possibility of including other tools along with the subsidies should be examined, in order to reach the desired outcome. There are cases where other tools are preferable to subsidies, for example, using structural changes in the maritime sector and regulation, which is unrelated to subsidies.
6. It is important to identify the reasons for the problem we are seeking to fix through the use of subsidies. Sometimes the causes require different handling, rather than subsidies. There are even cases where the use of subsidies will exacerbate or perpetuate failures, which are harmful to the efficient, optimal business in the shipping sector.
7. If using a subsidy, which succeeded in solving a problem in another country, it has to be adapted to the characteristics and environment of the local maritime sector. It should be noted that in some cases subsidies, which were successful in a specific situation and environment, have failed when applied to other countries without sufficient adjustment.
8. Subsidies should be planned in such a way that they will prevent obstructions to their optimal application and to the achievement of the goals for which they are applied in the first place. Experience around the world shows cases of administrative, regulatory, economic obstructions, which impaired the implementation of subsidies.
9. While the subsidy is in use and following it, it is recommended that it be re-evaluated. This includes, among other things, its effect and degree of accomplishment of the goals that had been set. According to the results, if necessary, adaptations and changes will be made.

Financial and Other Benefits Through Using Flag of Convenience in the World: Panama, Marshal Islands, Malta, Cyprus and The Bahamas[1]

Ofir Kafri

Introduction

Registration of vessels in FOC (flag of convenience) countries has accelerated since the 1950's.[2] In 1988, this registration has overtaken Traditional Maritime Countries scope (TMC).[3] Nowadays, most of the vessels in the world, by DWT (Deadweight Tonnage), are registered in flag of convenience countries.[4] Israel was also influenced by the use of flag of convenience and part of the vessels under Israeli ownership were registered in these countries.[5]

The main flag of convenience countries provide various benefits for vessels registered in their maritime registries. For example, in parts of these countries tax benefits and other governmental subsidies are given.[6] In addition, there are benefits for the

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1 This article is not to be considered as consulting, legal or other and should not be used beyond its academic purpose. Due to the scope limitation the article does not contain all the issues and complexities of the presented subjects.

2 There are different definitions to the term flag of convenience and this article will not elaborate on this issue. In this article, the definition of the ITF (International Transport Workers' Federation) is used. Hereinafter is the definition and the list of flags of convenience countries of the ITF and examples of additional definitions: International Transport Workers' Federation (ITF). Flags of convenience; Oliver Covey, "Review of Flags of Convenience: An International Legal Study by Boleslaw Adam Boczek". *University of Chicago Law Review*, 30(191) (1962); Zoya Özcayir, "Flags of Convenience and the Need for International Co-operation". *International Maritime Law*, 7(4) (2000), pp. 111–117; The Oxford Companion to Ships and the Sea (2 ed.). Oxford University Press. 2006.

3 A. Bergantino, and P. Marlow, "Factors influencing the choice of flag: empirical evidence". *Maritime Policy and Management*, 25(2) (1998), p. 157.

4 UNCTAD. Review of Maritime Transport 2020. November 12, 2020, p. 44.

5 For further reading about Israeli seamanship and flag of convenience as well as examples of governmental activity related to the domain: Israel. Department of the Transportation, The Israel Port Authority Statistical Yearbook Seamanship and Ports – 2020. pp. 91, 102; the Ministry of Transportation. The Israel Port Authority The crisis and the recovery Last update: August 2013; The Knesset Proposal of Seamanship Law (Foreign Seacrafts Controlled by an Israeli Body), 2004; Proposal of Internal Revenue Tax (Taxing Revenue from the activity of seacrafts by tonnage), 2018. Explanations.

6 O. M. Merk, "Quantifying tax subsidies to shipping". *Maritime Economics & Logistics*, 22 (2020), pp. 517–535.

registration of vessels such as relatively low administrative payments and a swift registration process, simple to carry out. Additional benefits include temporary registration in lenient conditions, registration of mortgages on vessels in convenient conditions, and few limitations regarding kind, age and tonnage of the vessels. Part of the flags of convenience enable dissimulating information about the owners of the vessels and other related entities, financial and other activities.[7]

The use of flag of convenience influences in various ways the maritime sector of countries and the international system as well as the maritime environment and other factors. For instance, flags of convenience caused the reduction of the scope of the civil fleet in various countries. In addition, research showed that flags of convenience sometimes create conditions which weaken the enforcement of international treaties regarding safe activity at sea. Vessels flying certain countries' flags of convenience were inclined to environmental pollution events, problematic working conditions, regulatory breaches and low salary. Additionally, in certain cases unsafe vessels were operated, unskilled manpower was employed and the ability to compete in the maritime sector was impaired.[8]

The large-scale passage of vessels to registration in FOC made countries act in attempt to deal with this issue.[9] Countries reacted by using several methods:[10] governmental subsidies were extended along with other benefits, secondary ship registries were established with easier requirements, regulatory changes were made, services given to registered vessels were ameliorated, etc.[11]. It should be noted that sometimes this competition led to facilitations which harmed countries.[12]

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7 For the world classification of countries by the level of financial secrecy: Tax Justice Network. Financial Secrecy Index – 2020 Results. February 18, 2020.

8 T. Alderton, and N. Winchester, "Flag states and safety: 1997–1999", *Maritime Policy & Management*, 29 (2002), pp. 151–162; M. Luo, L. Fan, and K. X. Li, "Flag choice behaviour in the world merchant fleet". *Transportmetrica A: Transport Science*, 9(5) (2013), pp. 429–450.

9 Merk, "Quantifying tax subsidies to shipping".

10 Sometimes these methods were also applied as part of the competition with other, non FOC countries.

11 Trying to get vessels to register anew in the national maritime registry was one of the reasons for extending benefits by the countries. cf. examples in the UE directives: EC. 2004. Community guidelines on state aid to maritime transport. *Official Journal of the European Union*, 2004/C 13/03. Brussels: European Commission.

12 For example, the international activity for dealing with damages incurred as a result of tax competition: OECD. Addressing Erosion and Profit Shifting. February 12, 2013; OECD. Action Plan on Base Erosion and Profit Shifting. July 19, 2013.

Due to the limitation on the scope of this article, it will review and demonstrate succinctly the following subjects. First, reasons for moving registration to flags of convenience will be described. Then, I will present several case studies of Flag of Convenience in the World that are considered among the largest in the world: Panama, Marshal Islands, Malta, Cyprus and The Bahamas. In the case studies some of the benefits extended to registered vessels will be exemplified. The article will present issues in regulation related only to registration in maritime registries and will not delve into other advantages in the field of maritime law in the case studies.[13] A few methods countries use to deal with the influence of flags of convenience on them will also be analyzed. Finally, some conclusions and suggestions that may help Israel in contemplating the possibilities of taking care of the influences of flags of convenience on the country, will be presented.

Reasons for moving to registration in FOC countries

There are various reasons for vessels' registration in FOC countries. The weight and centrality of some of the reasons changed through the years.[14] Many studies note economic, political, security, regulatory and administrative reasons. Examples of economic reasons were the offering of subsidies and other benefits, manpower costs and vessels operating, regulatory costs, etc.[15] Also influential were factors

13 For examples of maritime law legal issues analysis in case studies and other sources in this area cf.: Y. Baatz (ed.), *Maritime law*. Taylor & Francis (2020); C. Hill, *Maritime law*. Informa Law from Routledge (2017); R. Force, A. N. Yiannopoulos, and M. Davies, *Admiralty and maritime law* (Vol. 1). Beard Books (2005); Julian Clark (Contributing editor), International Comparative Legal Guides (ICLG). Shipping Laws and Regulations, 2021; Andrew Chamberlain, Holly Colaço and Richard Neylon (eds.), "The Shipping Law Review" *The Law Reviews*, 8 Edition, 2021; Lexology, Lawrence Rutkowski (ed.), Ship finance, Law Business Research, 2021; Legalease. Legal 500. Shipping. 2nd Edition, November 2020.

14 For example, use of tax benefits and other means by countries competing with flags of convenience led to that in recent years the importance of part of the reasons for passing, changed.: ITF, "Maritime Subsidies: Do They Provide Value for Money?", *International Transport Forum Policy Papers*, No. 70. OECD Publishing, Paris (2019), pp. 36–37.

15 For further reading of studies presenting various factors influencing the decision making regarding the passing to flags of convenience: Bergantino and Marlow, "Factors influencing the choice of flag"; H. A. Thanopoulou, "What price the flag? The terms of competitiveness in shipping", *Marine Policy*, 22(4–5) (1998), pp. 368–369; P. Marlow, and K. Mitroussi, "Shipping taxation: Perspectives and impact on flag choice", *International Journal of Shipping and Transport Logistics,* 3 (2011), p. 349; K. Mitroussi, and M. Arghyrou, "Institutional performance and ship registration", *Transportation Research Part E-logistics and Transportation Review*, 85 (2016), pp. 90–106.

such as the state of the vessels, the type of ship, its age, commercial use, possibilities of dissimulating the owners or the operators of the vessels.[16]

Case studies

There are certain differences between main FOC as for the characteristics of registered vessels among which are the type of vessel, average age, assessed value, etc.[17] The benefits and incentives given in these countries are varied and sometimes the emphases in the diverse incentives given, differ. In certain cases, there are unique incentives for a specific maritime sector, preferred geopolitical location and particular international legal arrangements. For example, the Bahamas constitute a convenience flag under which a large number of Cruise ships are registered due to benefits for this sector.[18]

Republic of Panama

The maritime registry in Panama is the largest vessel registry in the world today in Deadweight Tonnage.[19] Panama hardly puts any limitations on the citizenship of vessel owners registered in the state.[20] It is possible to register a vessel with no tonnage limit and also a vessel older than 20 years under a few provisions. Furthermore, Panama allows registration of vessels of different kinds under few limitations.[21] A Bareboat Charter may be registered as well as a ship already registered in a foreign registry.[22] As a result, almost any vessel may be registered in Panama.[23]

Mortgages of vessels and temporary registration of a vessel which is in a building process may be done. In addition, the registration process is quick and can be

16 Luo, Fan, and Li, "Flag choice behaviour in the world merchant fleet".

17 UNCTAD. Review of Maritime Transport 2020. November 12, 2020.

18 Top 10 flag states 2019. *Lloyd's List*, December 3, 2019.

19 F. Piniella, J. Alcaide, and E. Rodríguez-Díaz, "The Panama Ship Registry: 1917–2017", *Marine Policy*, 77 (2017), pp. 13–22.

20 For reading on Panama legislation regarding vessel registration: Panama Ship Registry. National Legislation.

21 A seacraft registration requires abiding by some provisions. The definition of the term vessel in the Panama legislation is very broad. General de Marina Mercante. Law 57 of August 6, 2008.

22 In order to carry out the registration in the maritime registry some conditions have to be met. See the definition of the term Bareboat Charter (charter of a vessel with no crew nor fuel): *Cambridge dictionary.* bareboat charter. Cambridge University Press, 2020.

23 Registration of a vessel in Panama which is also registered in another country requires meeting a number of provisions: Consulate General of Panama in New York. Maritime Section, 2021.

performed in a large number of missions in the world. The registration of vessels in the maritime registry allows exemptions from various taxes such as Revenue Tax on a certain international commercial activity.[24] In addition, Panama is considered a country which allows some financial confidentiality and weaknesses regarding control of financial activity in it were noted.[25] In 2021, the country appeared on a European Union list of countries that do not cooperate regarding the amending issues in the area of taxation (EU list of non-cooperative jurisdictions for tax purposes).[26] It is considered, according to some studies as a tax haven.[27]

Panama offers discounts on payments related to registration of vessels, compulsory annual payments and other costs. For example, discounts are given for new vessels, vessels less than five years old and vessels which are part of a group.[28] Another incentive is the existence of double taxing treaties with a number of countries and agreements regarding taxation in the maritime sector with the USA, Cyprus and additional countries.[29] Panama has signed agreements meant to alleviate somewhat the activity of seacrafts registered under its flag with countries such as Singapore and China.[30]

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24 There are a number of conditions to be met in order to get tax benefits in Panama. For reading about the tax regime in Panama in general and in the maritime sector cf.: Ernst and Young. *Worldwide Corporate Tax Guide*. 2020, pp. 1293–1308; PricewaterhouseCoopers (PWC). Worldwide Tax Summaries. Panama, 2021.

25 For further reading on financial confidentiality and control of money laundering in Panama cf.: International Monetary Fund. Western Hemisphere Dept. *AML/CFT Issues in Panama: Background and Policies*, April 21, 2020; Tax Justice Network. Financial Secrecy Index 2020. Narrative Report on Panama.

26 Council of the EU. Taxation: EU list of non-cooperative jurisdictions. October 2021.

27 For further reading of studies presenting tax havens, definitions of the term as well as limitations of these studies: C. Chavagneux, R. Palan, and R. Murphy, *Tax havens: How globalization really works*. London: Cornell University Press, 2010; J. Garcia-Bernardo, J. Fichtner, F. W. Takes, and E. M. Heemskerk, Uncovering Offshore Financial Centers: Conduits and Sinks in the Global Corporate Ownership Network. *Scientific reports*, 7(1) (2017), 6246; T. R. Tørsløv, L. S. Wier, and G. Zucman. The missing profits of nations (No. w24701). National Bureau of Economic Research, 2018; R. Phillips, M. Gardner, A. Robins, and M. Surka, *Offshore Shell Games 2017*. Institute on Taxation and Economic Policy and US PIRG Education Fund, 2017; J. R. Hines Jr, "Treasure islands", *Journal of Economic Perspectives*, 24(4) (2010), pp. 103–126.

28 Lexology. Law Business Research. Ship finance – Panama, 2021.

29 Ernst and Young, *Shipping Industry Almanac*, pp. 339–355.

30 Maritime and Port Authority of Singapore. Singapore and Panama Ink MoU to Strengthen Maritime Relations. September 19, 2019; Consulate General of Panama in HK. Panama renews maritime transport agreement with China. July 22, 2021.

Republic of Malta

In 2020, the maritime registry of Malta was considered the sixth largest in the world in DWT.[31] Malta advertises as an advantage its membership in the EU, its economic stability and its being an international maritime center providing various services. In the Maltese maritime registry, there are few limitations on owners' and the vessel's crew citizenship. There is an arrangement in the for a vessel of non-EU citizens may be registered. According to the Maltese registry the costs of registration are relatively low and discounts are offered to vessels of specific kind that are under the age of ten.[32] The Maltese maritime registry also claims that there are almost no limitations on the sale or transfer of shares of a company that is an owner of a Maltese ship. In addition, the maritime registry notes that there are few limitations on sale and mortgaging of vessels and some advantages regarding mortgages are offered.[33] Malta offers an incentive of tonnage tax for vessels of certain kinds and for activities of managing a ship instead of revenue tax, under certain conditions.[34]

Malta offers incentives to ship owners and additional elements regarding registration of ships over 1,000 tons.[35] In addition there are a number of benefits related specifically to shipping companies.[36] There is also a registry of Bareboat Charter which get an array of benefits.[37] In the case of yachts there are benefits such as low costs of registration and tax relief.[38] Malta has a number of double taxing treaties and agreements with several countries. In 2020 it was ranked 18th in the world for financial confidentiality. In certain areas it provides possibilities for concealment of

31 UNCTAD. Review of Maritime Transport 2020. November 12, 2020, p. 44.

32 Directives regarding registration of seacrafts and the 1973 Merchant Shipping Act of Malta: Transport Malta. Malta – A Guide to Ship Registration; Legislation Malta. Merchant Shipping Act. Chapter 234.

33 Transport Malta. Mortgages; Transport Malta. Ship Registration.

34 For further reading about the provisions for getting tonnage tax and the tax regime in Malta in general: PricewaterhouseCoopers (PWC). Malta – Corporate – Taxes on corporate income. Last reviewed September 3, 2021; Deloitte. International Tax. Malta highlights. January 2021; International Comparative Legal Guides (ICLG). Shipping Law – Malta. 2021.

35 Malta Ship Registry. Ship Registration.

36 KPMG. Ship Registration in Malta. 2021.

37 The registration of certain kinds of seacrafts as Bareboat Charter in Malta requires meeting a number of conditions. For more elaboration: Transport Malta. Bareboat Charter Registration.

38 U.S. Department of Commerce. International Trade Administration. Malta – Country Commercial Guide. Last published date: October 19, 2020; Transport Malta. Why choose the Malta Flag.

data on financial activity.[39] The state, according to a number of studies, has the characteristics of a tax haven.[40]

Republic of Cyprus

In 2020, the Cyprus maritime registry was ranked 11th in DWT of vessels.[41] In Cyprus various kinds of vessels can be registered.[42] The state allows the registration of certain types of vessels whose age is over 25 years.[43] In addition, registration of Bareboat Charter may also be done.[44] Cyprus offers tax benefits to vessel owners, charters and ship managers. For example, ship managers can get tax benefits on crew management profits, dividends from profits, etc.[45] In the year 2019 the European Commission acted against Cyprus claiming that it enabled a significant VAT reduction for chartering yachts in contradiction to the European Commission directives.[46] Cyprus provides some degree of confidentiality as to financial activity and was ranked 27th in the world in 2020.[47] A number of studies show that the state has characteristics of a tax haven.[48]

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39 For further reading: Moneyval. Council of Europe. Anti-money laundering and counter-terrorist financing measures – Malta. Fifth Round Mutual Evaluation Report. July 2019; Tax Justice Network. Financial Secrecy Index. Malta (MT). Reporting Period: 2020. February 20, 2020.

40 For further reading of studies and grading of tax havens cf. footnote 27.

41 UNCTAD. Review of Maritime Transport 2020. November 12, 2020, p. 44.

42 The carrying out of a registration is subject to meeting a number of conditions and limitations. See for example the following legislation regarding the registration of vessels in Cyprus: The Merchant Shipping (Registration of Ships, Sales and Mortgages) Laws of 1963 to 2020 (Law 45/1963 as amended).

43 The registration of vessels over a certain age requires meeting conditions that Cyprus has set. Republic of Cyprus – Shipping Deputy Ministry. Circular No.:10/2019, paragraphs 2.2–2.4. May 23, 2019.

44 The registration of Bareboat Charter is done subject to certain conditions. Republic of Cyprus – Shipping Deputy Ministry. Types of Registration.

45 Tax benefits are given following meeting a number of conditions. Examples of legislation on the issue of taxation in the maritime sector in Cyprus and data about said tax: The Merchant Shipping (Fees and Taxing Provisions) Laws of 2010–2020 (Law 44 of 2010 as amended); The Tonnage Tax for Ship Managers (Special Provisions and Requirements) Notification of 2010 (P.I. 511/2010); PricewaterhouseCoopers (PWC). Tax Facts & Figures 2021 – Cyprus. January 2021, pp. 20–22.

46 European Commission. Commission takes further steps to end illegal tax breaks in the Italian and Cypriot yacht industries. July 25, 2019.

47 Tax Justice Network. Financial Secrecy Index 2020. Narrative Report on Cyprus.

48 For further reading of studies and grading in the area of tax havens cf. footnote no. 27.

Cyprus offers various subsidies beyond tax benefits, related to the maritime sector.[49] The state has signed bilateral agreements with about 25 countries meant to enable a preferential treatment for vessels registered under its flag.[50]

Republic of the Marshall Islands

The maritime registry of the Republic of the Marshall Islands (RMI) is the 3rd largest in the world by DWT.[51] The RMI offers a number of benefits such as vessels registration with no tonnage limitation. In addition, it is possible to register a vessel the age of which is over 20 years old.[52] According to the company running the maritime registry, the final owners' details, i.e., the Beneficial Owners, are not accessible to third parties subject to certain reservations. Another benefit is the registration of vessels in a relatively short time in various locations around the world.[53] There are a number of benefits for various kinds of yachts such as comfortable registration conditions, bonus in compulsory payments and easier activity conditions.[54]

The Maritime Act 1990 of the RMI sets a number of conditions regarding the maritime registry.[55] According to Article 203, a few entities may register vessels such as an approved foreign maritime entity.[56] An additional benefit is that there is almost no citizenship restriction on the vessel's crew and owners. Furthermore, according to the Business Corporations Act (1990) the RMI exempts certain kinds of businesses defined as non-resident entities from various taxes such as companies and partnerships.[57] According to state publications, exemptions from revenue

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49 Ernst and Young. *Shipping Industry Almanac*, pp. 119–124.

50 International Comparative Legal Guides (ICLG). Cyprus: Shipping Laws and Regulations. 2021.

51 UNCTAD. Review of Maritime Transport 2020. 12 November 2020, p. 44.

52 The RMI puts up a number of conditions for considering allowing the registration of seacrafts in these cases. For example, a bulk carrier the age of which is 15 years or over has to undergo a compulsory check prior to the registration in the maritime registry. Other seacrafts from the age of 20 also have to undergo a check prior to the registration.

53 International Registries, Inc. (IRI). Vessels Eligible for Registration in the RMI.

54 There are various conditions which yachts have to meet to get benefits. For example: International Registries, Inc. (IRI). Yacht-General Information.

55 The Maritime Act 1990 of the Republic of the Marshall Islands. updated as of September 2016.

56 Republic of the Marshall Islands. Vessel Registration and Mortgage Recording Procedures. MI-100. Rev. Jun, 2018, pp. 8, 11.

57 In order to get tax exemptions some conditions and limitations have to be met. Reference to the tax exemptions can be found in a number of legislation acts of the RMI. See for example: Republic of the Marshall Islands. Business Corporations Act 1990. Section 12; Marshall Islands Revised Partnership Act. Title 52 – Association Law Chapter 2. Exemptions for non-resident

tax, corporate tax etc., are extended subject to a number of conditions.[58] The RMI was defined in 2019 by the EU as a state which does not cooperate in mending malfunctions in the taxation area. It was noted that there are, among other things, arrangements which enable the transfer of profits to its jurisdiction with no real economic activity.[59] According to a number of studies there existed certain aspects of a tax haven.[60]

Commonwealth of The Bahamas

The maritime registry of The Bahamas was ranked in 2020 8th in the world by DWT of vessels.[61] In The Bahamas there is a tax regime which extends incentives such as absence of tax on capital gains and on the revenues of companies under certain conditions. In addition, there are benefits regarding various compulsory payments.[62] Furthermore, in The Bahamas there is the possibility for confidentiality to some degree relating to certain financial and commercial activities. It is ranked 22nd in the world in financial confidentiality.[63] According to a number of studies there are, aspects of a tax haven.[64]

According to the BMA (Bahamas Maritime Authority) which is responsible for the maritime registries, a large array of kinds of vessels can be registered subject to

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entities. Section 73; Marshall Islands Limited Partnership Act. Title 52 – Association Law Chapter 3. Section 73; Swiss Institute of Comparative Law. Legal Opinion on Maritime Registration. E-Avis ISDC 2018-15. April 6, 2018.

58 Trust Company of the Marshall Islands, Inc., Associations Law. November 2017, pp. 5–6, 50–52.

59 The RMI claims that it has set regulation meant to lessen the use of sovereignty as tax haven including in the maritime area. The RMI has been taken off the black list of the EU in 2019. Republic of the Marshall Islands. Economic Substance Regulations, 2018, as amended, through August 29, 2019; Council of the European Union. The EU list of non-cooperative jurisdictions for tax purposes – Marshall Islands: final legislation and assessment under criterion 2.2 11. October 2019; Lexology. Law Business Research. Ship finance – Marshall Islands. 2021, pp. 44–45.

60 For further reading of studies and grading in the area of tax havens cf. footnote 27.

61 UNCTAD. Review of Maritime Transport 2020. 12 November 2020, p. 44.

62 Incentives and benefits in The Bahamas are extended subject to certain conditions. For elaboration on the tax regime: Ernst and Young. *Worldwide Corporate Tax Guide 2021*. July 2021, pp. 123–127; Bahamas Investment Authority. Guide for Investors. Ship Registry. 2011; Ernst and Young. *Worldwide Personal Tax and Immigration Guide 2020–2021*, pp. 108–112; Deloitte. International Tax. Bahamas highlights. January 2021.

63 FATF. Anti-money laundering and counter-terrorist financing measures – The Bahamas. Mutual Evaluation Report. 2017, pp. 117–122; CFATF Follow-Up Report – The Bahamas. 2018; Tax Justice Network. Financial Secrecy Index. Bahamas (BS). Reporting Period: 2020.

64 For further reading of vessels and grading in the area of tax havens cf. footnote no.27.

relatively few limitations. It is claimed that the process of registration is swift and various services for vessels are offered in a number of localities around the world. Subject to certain conditions registration of Bareboat Charter vessels registered in another country's registry can be done.[65] The registration of yachts is carried out with relatively few reservations, e.g., there are no limitations on the citizenship of the vessel's crew and the owners.[66] The Bahamas have an agreement with China which allows for vessels registered there rebates on payments and additional benefits while visiting ports in China.[67]

Methods used by countries for dealing with the passage of vessels to flags of convenience

Countries act in various ways in an attempt to deal with the passing of vessels registered in their jurisdiction to flags of convenience countries.[68] Such methods include subsidies, secondary registers that provide easy conditions and alleviating regulations.[69] Additional methods are the extension of a swift and alleviating service for actions related to the registry of vessels, the offering of worldwide services, use of legal and maritime status of the state for registered vessels, the use of assisting international agreements, few limitations on citizenship of the vessels' crew and owners and more.[70]

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65 Bahamas Maritime Authority. Bahamas Advantages.

66 The registration shall be done following meeting some conditions. It should be noted that yachts are extended additional benefits such as few limitations on selling and mortgaging of the seacrafts. Bahamas Maritime Authority. Benefits of registering a yacht in The Bahamas.

67 Bahamas Maritime Authority. Bahamas Preferential Maritime Agreement with China.

68 For example, it was claimed that incentives extended by some of the traditional maritime countries sometimes reduced the differences between the traditional and the FOC countries. See the following research: Bergantino and Marlow, "Factors influencing the choice of flag", p. 159.

69 Benefits meant to reinforce the maritime registry were not always successful. For example, in 2007, China started extending benefits in the framework of the STFSR (special tax-free ship registration) policy meant to get back the registration of ships that passed to flag of convenience. The plan suffered from administrative obstructions and weak benefits which made for its failure. For elaboration of the subject: Chen, J., Li, K., Liu, X., and Li, H., "The development of ship registration policy in China: Response to flags of convenience". *Marine Policy*, 83 (2017), pp. 22–28.

70 See for example the advantages of registering vessels of various kinds in Singapore: Maritime and Port Authority of Singapore. Benefits of SRS. 2021.

The USA is an example for a state which extends tax benefits to vessels registered there. E.g., operators and ship owners under USA flag who bought a ship or replaced a ship with a new one may get a deferment of revenue tax under certain conditions. According to the MARAD (Maritime Administration of the USA) the plan intends to deal with the competition difficulties created among the operators of ships under USA flag opposed to ships registered in countries with no tax. The aim of the plan is to aid the renewal of the civil fleet.[71]

Another example for extending benefits is Germany which offers various subsidies for ships registered in German registries such as tax benefits, reduced payments and financing of comprehensive insurance for accidents and illnesses.[72] Another benefit is the preference in getting certain services in ports around the world stemming from agreements between Germany and about 80 other countries. Germany provides protection and aid for vessels and their crews in certain cases through its diplomatic missions.[73] It should be noted that Germany has also established the GIS (German International Shipping Register) that offers alleviating conditions for certain vessels. This registry was defined by the ITF as a convenience flag.[74]

The establishing of Second ship registry with alleviated conditions by countries which are not FOC is another method. Countries have started to operate second registries in order to strengthen their competitiveness, inter alia, aiming at the passage of seacrafts to flags of convenience.[75] The second registries are aimed at enabling conditions that are closer to those offered in the flags of convenience registries such as the use of foreigners. In certain cases, this method proved successful regarding the problem of ships passing to registration under flags of convenience.[76] It should be noted that the extent of the success in using this tool for increasing or conserving the commercial fleet varies among countries.[77]

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71 U.S Maritime administration. Capital Construction Fund. Last updated: July 15, 2021.

72 Benefits on behalf of the government of Germany are extended under certain conditions. For example: German Federal Ministry of Transport and Digital Infrastructure. Changing to the German flag. Subsidies, Fees.

73 German Federal Ministry of Transport and Digital Infrastructure. Advantages of the German flag.

74 International Transport Workers' Federation (ITF). Flags of convenience.

75 Yin, J., Fan, L., and Li, K. "Second ship registry in flag choice mechanism: The implications for China in promoting a maritime cluster policy". *Transportation Research Part A-policy and Practice*, 107 (2018), pp. 152–165.

76 Thanopoulou, H. A., "What price the flag? The terms of competitiveness in shipping". *Marine Policy*, 22(4–5) (1998), 359–374, pp. 368–369.

77 Yin, Fan and Li, "Second ship registry in flag choice mecahnism".

Second international registries were established in countries such as France (FIS), Norway (NIS) and Denmark (DIS).[78] E.g., the international maritime registries of Denmark and Norway are ranked, in Deadweight Tonnage, at the 14th and 15th places respectively out of all maritime registries in the world.[79] In some cases it was claimed that the second registries became flags of convenience, such as the FIS (French International Ship Register).[80]

Conclusion

The passing of vessels to registration under flags of convenience creates a challenge for countries which are negatively affected. Some of the countries chose to use different methods aiming to stop this trend and deal with its effects. Countries have used methods such as extending subsidies, regulatory alleviations, a second maritime registry, providing swift and efficient services, supporting international agreements and treaties, alleviations through legal and maritime status of the country and legal aid.

How successful were the countries' dealings with the passing of vessels to FOC? The results were mixed. Different reasons affected the results such as the kinds and characteristics of the methods used, the availability of sufficient resources and the scope of the costs of the treatment, the economic and commercial situation in the international maritime sector, etc. In certain cases, countries chose not to deal with this problem for reasons like the costs surpassing the benefits, investing resources in promoting other subjects in the maritime sector and lack of a national interest.

A number of lessons arise from the accumulated experience in the international maritime sector. Hereinafter is a list of a few points which may help decision makers in Israel when they consider the subject:

1. First it should be examined whether there are a national interest, abilities and sufficient benefits in investing resources in this endeavor. Sometimes investing in other issues within the maritime sector may be more beneficial for the country.

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78 Sources on the international maritime registry of Denmark (DIS): SSornn-Friese, H., and Iversen, M.. "The establishment of the Danish International Ship Register (DIS) and its connections to the maritime cluster". *International Journal of Maritime History*, 26(1) (2014), pp. 82–103; Danish Maritime Authority. About the Danish ship registers.

79 See for example the differences between the international maritime registry of Norway (NIS) compared to its national maritime registry (NOR): Norwegian Maritime Authority. Registration of commercial vessels in NIS/NOR. What distinguishes NIS from NOR?.

80 International Transport Workers' Federation (ITF). Flags of convenience.

2. The state should set goals for adapting the right tools for the task. Not setting goals or choosing too general goals might bring about an unwanted outcome. Furthermore, incentives and benefits focused on achieving the goals directly should be chosen so that no uncalled-for results will arise or that there will be an inefficient squandering of resources. Setting goals will enable the reexamination of the success of the process and carrying out adaptations if needed.
3. Actions for the strengthening of the maritime registry should relate to characteristics of the vessels of interest for registration. The enlargement of the maritime registry for vessels which are not beneficial to the state's interest or that their benefit is marginal at best, is an unwanted result. There are known problematic cases in the world such as registration of vessels with no added value for the economy, old and polluting ships which have caused damage or registration of vessels which is temporary and unstable in the long run.
4. The state should examine the tools and their optimal characteristics for obtaining the state's goals.
5. The state should align with the efficient and innovative countries in the international maritime sector as to the quality of the services it provides to this sector. It should be noted that a positive influence stemming from improvements and the extension of benefits may be impaired due to failures of the state in this area.
6. What happens in competitive registries in the international system should be examined so that the correct and efficient treatment is chosen. It is also important to map the characteristics, such as needs and interests of the vessels which may be the target for incentives for registration in Israel.
7. It is recommended that the state sets a strategy for this issue and act accordingly. This will enable, *inter alia*, the optimal integration of methods, treatments of weaknesses and leveraging strengths. The absence of a strategy might lead to waste of resources, focusing on erroneous goals, etc.

Reform in the Ports of Israel – Vision and Reality

Arieh Gavish

In 2005, Israel's commercial ports underwent a reform. The reform applied to the Port of Haifa, the Port of Ashdod and the Port of Eilat, which had been incorporated as "governmental corporation", headed by the Director General of the Israel Ports Authority. The Ports Authority was established in 1961 by former Chief of Staff Haim Laskov, structured along the lines of a military organization. The reform got underway after many years of underperformance in the ports, particularly in terms of the labor relations between management (the Israel Ports Authority which operates under the Ministry of Transport) and the workers who were organized in a large number of different unions, backed by the Histadrut labor federation.

The Knesset replaced the structure and law (the Ports Authority Law 1961) with a new structure for the ports under a new law (the Shipping and Ports Authority Act, 2004). A government company was established – the Ports Development & Assets Company LTD – in short, the Israel Ports Company (IPC), and the ports' lands were put under its jurisdiction. Each port was turned into a government company (Ashdod Port Company, Haifa Port Company, Eilat Port Company), and it was decided that the Ashdod and Haifa Port companies would be privatized, although the State would retain control, while the Port of Eilat would be fully privatized at 100% of its value. The privatizations were supposed to have ended five years after the reform got underway, meaning in 2010. The regulation as assigned to the Shipping and Ports Administration, which was upgraded into an Authority. The reform was supposed to achieve the following goals:

- Competition.
- Increased efficiency.
- Curtailing the power of the unions – this goal was never declared in public, nor was it included as an official goal of the reform.

At this time, several questions arise:

- Has the reform in the ports since 2005 been successful?
- Will the start of operation of the Bayport Terminal (in the Haifa Port) and the Southport Terminal (in the Ashdod Port), which is scheduled for the end of 2021, improve the ports' performance?
- Could we expect real competition, meaning advanced competitiveness among the various bodies working in unloading and loading of cargoes in Israel's ports?

- Is it right to have the Israel Ports Development & Assets Company Ltd. (IPC) continue to exist in its current state?
- Is it good for competition? Is it justified?
- Is IPC currently operating with conflicting interests, which constitute a market deficiency?

Before I set about discussing the above mentioned questions, I would like to correct a misconception shared by many people. The two new terminals which are referred to as ports, the Bayport Terminal and the Southport Terminal, are not ports but rather they are terminals. They are yet another authorized corporation within the port, the Bayport Terminal within the Port of Haifa and the Southport Terminal within the Port of Ashdod. The main reasons why I recommend they be called terminals are:

1. The Bayport Terminal and the Southport Terminal are located within the areas of jurisdiction of the Haifa Port and the Ashdod Port respectively (the areas of jurisdiction of the ports of Haifa, Ashdod and Eilat are defined separately by the Minister of Transport in a specific regulation for each port within the Ports Regulations).
2. The two companies operating the terminals (SIPG and TIL) lease the terminal land from the IPC and in addition they pay leasing fees.
3. IPC is the landlord of these two terminals as well as of the Port of Eilat.

I therefore recommend that the following definition be used: the Bayport Terminal and the Southport Terminal, are located in the Haifa Port and the Ashdod Port respectively. Thus, we will do justice to the semantics and to the nature of these terminals.

Has the reform in the ports been a success? Has it yielded a real improvement in the ports' performance?

Many people hoped the 2005 reform in the ports would cure the ports' substandard performance, which included strikes, long wait times for ships outside the port due to workload, ships being docked in the ports and along the docks for inordinately long times, much damage to cargo (sometimes including severe injuries to workers) etc.

The current situation in the ports indicates that the reform has failed to achieve its goal. There is a lot of waiting, strikes still occur – some of them illegal, cargoes take a long time to be loaded and unloaded, occupational accidents afflict workers and cause damage to cargoes, and the list goes on.

I would be an understatement to say that customers of the ports are dissatisfied with the ports' performance. The users complain time and again about the ports' performance. They also recommend how to improve the situation (recruit new workers, improve the operational queue, technological improvements, improve procedures, and so forth). I assume that if a real customers' satisfaction survey were to be conducted as to the ports' performance, the result would be decidedly unflattering. Regretfully, the general feeling is bad in this respect.

Therefore, in my opinion the success of the reform should be examined from a more distant standpoint, in other words, we will know whether the reform has succeeded only far in the future. Furthermore, it would be appropriate to examine whether the reform in the ports was a success in a thorough study, including a large number of port characteristics.

The substandard performance in the ports dictated radical change. The 2005 reform in the ports expresses the best and the most of the improvements which were achievable under those days' circumstances (political, organizational, labor union-government, etc.). That reform should be considered as a first stage in a long and inevitable **process** of restructuring the ports. The following principles should be noted in the implementation of the reform in the ports:

- Privatization – today there no longer any doubts as to the potential contribution this measure can make.
- The passing of the regulation of the ports to the Israel Shipping and Ports Authority, which is a professional body within the Ministry of Transport.
- The disbanding of the Israel Port Authority and the setting up of a different organizational structure, thereby "weakening" the strength of the unions and preventing them from keeping their stranglehold in their domain.
- The improvement of the ports' performance – streamlining, lowering costs, improving processes, innovation, etc.

None of these things even hints at harming the terms and status of the port workers. I believe that the current terms of employment of the port workers have been achieved legally, however, giving a group of workers the power to shut down Israel's foreign trade is simply untenable. The 2005 reform was an **unavoidable first step** toward dealing with the deficiencies of the monopoly called the Israel Port Authority.

The results of operating the Israel Shipyards docks since 2009 as a private port company are proof of the necessity of privatization and initiation of competition between the terminals. In its 12 years in existence, the Israel Shipyards Port Company

has exhibited healthy growth in the amount of cargo it handles. In 2009 the company handled 0.5 million tons of general cargo, which accounted for 16.8% of all the general cargo in the ports. In 2020 the company handled 1.712 million tons of general cargo, out of a total of 4.119 million tons in the four ports, which accounted for 42.5% of all the general cargo in the ports. This is in contrast to the Haifa Port Company with 967 thousand tons, or 24.1% of the total general cargo in the ports, the Ashdod Port Company with 1,339 million tons, or 33.1% of the total general cargo in the ports and the Port of Eilat company with 149 thousand tons or 0.04% of the total general cargo in the ports (all data are from the 2020 statistical yearbook of the Israel Shipping & Ports Administration, the actual results may vary slightly). The Israel Shipyards Port is able to handle any cargo it chooses. For various reasons the management of the Israel Shipyards Port decided to specialize and handle general cargo, including bulk: cement, grain, etc. The Israel Shipyards Port is a tangible example of a small private port company (terminal), limited in its dock capacity that, through proper management, creativity and working correctly, delivers outstanding service to its customers and even yields decent profits for its owners.

The Israel Port Authority had been responsible for the three ports (Haifa, Ashdod, Eilat). In its lifetime, from 1961 to 2005, it was both a port operator and a port regulator – effectively a glaring conflict of interests. This is just like allowing the cat to guard the cream. Anyone that had been involved in this sector during the Israel Port Authority period is painfully aware of how deeply the Ministry of Transport was involved in operations – the ministry responsible for the ports, which had also to be the regulator of their operations. Officially, the Ministry of Transport was the regulator of the main trade ports of Haifa, Ashdod, Eilat. In practice the Ministry of Transport was no more than a rubber stamp. The Israel Port Authority also had many achievements to its credit: substantially reducing the workforce headcount, development of the ports, introduction of new technologies and resources into the ports, and more.

I have no intention to review the Israel Ports Authority performance throughout its existence (1961–2005), for better or for worse. One thing, however, is clear: as the main artery of the State of Israel's foreign trade at peace and in war, the role of the Israel Port Authority was highly important and it had a major influence on Israel's economic situation. The Israel Ports Authority's shortcomings outweighed its advantages and for this reason the 2004/5 reform was made. The Israel Ports Authority was disbanded, the Ports Authority Law of 1961 was scrapped and replaced by the Shipping & Ports Administration Act of 2004. The main points of the reform are:

- Transferring the regulation under the Israel Shipping and Ports Administration and turning it into an Authority.
- Cancellation of the Israel Ports Authority Staff and turning it into the Israel Ports Development & Assets Company Ltd. (IPC), a government corporation for its entire lifetime.
- Setting up three government companies (Haifa Port Company, Ashdod Port Company, Eilat Port Company).
- It was decided that the three government companies would be privatized within five years – a move which failed to take place. The Port of Eilat Company was privatized as planned but belatedly, in 2013, while the Ashdod Port Company and the Port of Haifa Company have to date not been privatized.

Later on, the infrastructure for the two new terminals was designed and built (the Bayport Terminal and the Southport Terminal). A tender was issued to operate the new terminals, the companies which would operate them were selected (SIPG-Shanghai International Port Group – a subsidiary of the Port of Shanghai in China to operate the Bayport Terminal, and TIL – Terminal Investment Limited – a subsidiary of the MSC shipping company – to operate the Southport Terminal). These terminals are scheduled to begin operations in the final quarter of 2021, upgrading the competition between the terminals for container loading and unloading.

The start of operation of two new container terminals (the Bayport Terminal and the Southport Terminal) is a momentous, highly significant milestone. The Bayport Terminal began operations on September 1, 2021 while the Southport Terminal is supposed to start operations at the end of 2021. Initially operations will be in trial mode for half a year to a year, followed by full-scale operations afterward. The opening of these new terminals raises questions within Israel's ports sector, which for years had been a government monopoly and various parts of it still are monopolies, some say ham-fisted monopolies.

Following are a few characteristics of the new terminals. The two terminals are very similar in their characteristics. To understand the issues in this article, I shall elaborate on a few characteristics they both share:

1. Dock length – 700–800 meters.
2. Container storage space very near the dock.
3. Deep water dock – planned depth near the dock – 17.3 meters (neither the Port of Haifa nor the Port of Ashdod reach such depth). Achieving such depth near the docks is the result of dredging – the dock floor is specially encased

and depth maintenance work continues regularly. Recently the Ashdod Port Company deepened Dock 21 in order to turn it into a dock suitable for container megaships, to a depth of 17.3 meters.

4. The location of these terminals – literally at the port mouth, after the port entry channel, in Haifa in the eastern part of the port, in Ashdod in the northern part of the port. This parameter indicates a shorter maneuvering time for ships arriving at these terminals. In addition, a turnaround diameter of approximately 600 meters has been designed for each dock.
5. The terminal is going to be operated by a **private** company, SIPG in Haifa and TIL in Ashdod. The two winning companies in the tender are international with plenty of experience in operating container terminals where millions of containers are loaded and unloaded every year.
6. There is an entry and exit gate to each terminal, separated from the gates of the Port Company of Haifa and of the Port Company of Ashdod, and of course from other corporations operating in the port.
7. Each company chose a **TOS** – the Terminal Operating System – a computer system for managing all of the port activities.
8. Eight ship to shore gantries – STS – in each terminal.
9. Container storage areas with gantry cranes. All the gantries are operated via the TOS system which operates and controls throughout the entire terminal, automatically or semi-automatically.
10. The porters (the port operational workers), the terminal workers will be Israelis, management members can be foreigners.
11. The two companies operating the terminals are private enterprises. This will give the terminal managements a great deal of management flexibility, something that does not exist today in the Port Companies (Haifa, Ashdod).

Having presented these data, we can now make a better-grounded assessment that the planned competition between the terminals is missing several elements. **Is there going to be real competition in the terminal sector between these terminals and Haifa Port and Ashdod Port companies?** In my opinion, there will be competition between the new terminals and the port companies, however this is not going to be real, sophisticated, fair free-market competition.

The Terminals of Haifa Port Company and Ashdod Port Company will be missing a few elements: Dock depth; Dock length; Previous generation gantries, information systems. The Haifa and Ashdod port companies will be employing unionized, highly-paid workers with generous collective bargaining agreements. Clearly there is going

to be a great deal of diversion of containers from the existing port companies (Haifa, Ashdod) to these new terminals. What is the percentage of cargoes that will be diverted? This remains unclear, but the existing port companies are working to deal with this question. Their working assumption is that at least 50% of the cargoes (containers) are going to switch to the new terminal. The preparations and the coping of the port companies with the age of competition are being done in various ways, they have not necessarily chosen the same path. I will describe the main points of the future plans drawn up at the Haifa Port Company and at the Ashdod Port Company in their preparations for this new age.

Haifa Port Company

Generally speaking, the Haifa Port Company's strategic plan from several years ago[1] is being implemented, thus the Haifa Port Company will be prepared for competition with the Bayport Terminal. The privatization of the Port Company through the introduction of a strategic investor will improve the Haifa Port Company's ability to compete and will enable it to cope with this adversary that is forming in front of its eyes. Here are the main improvements required:

1. The port privatization – introduction of a strategic investor with international experience in loading and unloading of containers, that will invest in development and in the operational processes, such that the Port will be fit for competing with the private terminals.
2. The investor/operator should develop the unused dock of the Carmel Terminal, deepen it as a deep-water dock similar to that of the Bayport Terminal so that container Megaships (approximately 18000 TEU's) will be able to enter the port to load/unload containers.
3. Development of the northern portion of the eastern dock such that Panamax ships will be able to load/unload general cargo.
4. Development of the Kishon East dock for general cargo.
5. Upgrading of the Kishon West dock for general cargo.
6. Manpower agreements (early retirement incentives etc.).
7. Raising and lengthening the booms of the ship to shore gantries STS.

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1 Aryeh Gavish, "The Activity of the Ports in Israel – The Port Operating Model by Means of the Israel Port Company Using the Landlord Method and by Means of the Port Authority", in Shaul Chorev and Ehud Gonen (eds.), *Maritime Strategic Evaluation for Israel 2019/20* (Haifa: Maritime Policy and Strategy Research Center, University of Haifa, 2020).

Ashdod Port Company

Generally speaking, the Ashdod Port Company's strategic plan from several years ago[2] is being implemented, thus the Ashdod Port Company will be prepared for competing with the Bayport Terminal. Here are the main improvements required:

1. Deepening of dock 21, converting half of it for container loading and unloading, with the second half having pneumatic installations for grain unloading.
2. Grain unloading by building a special conveyer from dock 21 to the port's inland terminal, a distance of approximately 2.3 km from an existing grain silo. After the grain conveyer will be built from dock 21 to the Ashdod Port's inland terminal, the grain cargoes will be transferred in bulk through the conveyer (expected within two to three years from now). This will replace the current grain unloading, which is done through grabs into a truck, which transports the grain to the silo in the Port's inland terminal.
3. Restructuring agreements, retiring veteran workers.
4. Recruitment of young manpower.
5. Dock 25 might be used (this matter is in dispute between the workers and the management. The workers demand that dock 25 be part of the Ashdod Port, while IPC has not yet approved the workers' demands.)
6. Investment in innovation processes and start-ups.

Should IPC continue to exist as the landlord in the current age of competition?

During the debates over the reform in the ports sector in 2003 and 2004, the issue of the Israel Ports Development & Assets Company Ltd. (IPC) as landlord of the ports arose. Some suggested that the municipalities of Haifa and Ashdod should become the landlords of their respective ports. However, IPC became the landlord of the three ports: Haifa, Ashdod and Eilat.

In addition, it was decided that the Marine Department of the Haifa Port and that of the Ashdod Port would remain within their organizational structure in the Haifa Port Company and the Ashdod Port Company. The decision to leave the Maritime Departments within the Port companies was apparently a concession to labor union pressures, which were content with the existing organizational structure. They

2 Ibid.

felt stronger within the Haifa Port Company and the Ashdod Port Company, and therefore they refused and did not move to IPC.

The reform in the ports, therefore, was incomplete. It was decided that after the privatization of the three ports, which was planned for 2010, the Maritime departments of Haifa and Ashdod would move over to IPC. This would have made IPC a full-scale landlord of the three ports, including the Port Companies (Haifa, Ashdod, Eilat) and of all of the authorized corporations in the ports. Within this framework, the Marine Departments of the Port Companies of Haifa and Ashdod would move over to IPC. In the Port of Eilat, due to its small size, the issue of transferring the Marine Department there to IPC was not discussed.

In reality, the following things happened:

- Only the Eilat Port Company was 100% privatized as planned, albeit belatedly, in 2013.
- The Haifa Port Company and the Ashdod Port Company have not been privatized to this day. There is a plan to privatize the Haifa Port Company, and for this a tender was issued, and is currently in its final stages. IPC is supposed to choose a concessionaire out of the existing candidates, thereby effectively privatizing the Haifa Port Company. Clearly, this way it will be possible to compete against the Bayport Terminal and the small and efficient Israel Shipyards Port.
- At the Ashdod Port Company there is no talk at all of privatizing the port, despite the inherent advantages. It is actually hard to assume they are not thinking about it.
- The marine departments of the Haifa Port Company and the Ashdod Port Company were transferred to IPC at the end of 2020 following protracted discussions, ten years after the original target date. IPC set up two subsidiaries to operate the maritime domain of the Haifa Port and Ashdod Port – the Government Company Marine Transport Haifa and Government Company Marine Transport Ashdod. One has to bear in mind that the employees in the marine departments in the Port companies moved over to the IPC subsidiaries (approximately 100 employees in each department) voluntarily according to an agreement that there would be no change in their terms of employment or wages, including their remaining under a collective bargaining agreement for many years.

According to the Shipping and Ports Authority Law, 2004, IPC is committed to fulfill two main functions:

1. IPC manages the ports' real estate, it is the owner of the jurisdiction in the ports on land and at sea. Each port's area of jurisdiction (Haifa, Ashdod and Eilat) is defined in the Ports Regulations. On land, IPC leases areas to various corporations.
2. IPC is responsible for planning and developing the ports, including their maintenance, promotion and encouragement of competition between the various entities operating in the ports.

Authorized corporations within the Haifa Port on the land section:

- Israel Shipyards and its subsidiary, the Israel Shipyards Port.
- Bayport Terminal.
- Haifa Port Company.
- The Fuel Port Company – Government Company Petroleum & Energy Infrastructures Ltd. (Energy Infrastructures).
- Dagon Silos – the Gadot Company recently won the concession to operate the silo, including unloading of grain and distribution to the importers.
- Chemicals Terminal – IPC recently received the terminal workers and it now operates the terminal.
- Israel Navy Base – leased to the Ministry of Defense.
- The Shavit Marina and Fisherman Wharf – owned and operated by IPC.

Authorized corporations in the Ashdod Port on the land section:

- Southport Terminal.
- Ashdod Port Company.
- Dock 11, 12 ICL (Israel Chemicals Ltd.).
- Ashdod Israel Navy Base.
- Operation of Dock 30 – IPC operates Dock 30 to unload bulk cement.
- Dock 25 – the responsibility for operating dock 25 is in dispute between the workers and the management.

The marine space at the Haifa Port and the Ashdod Port extends from the port, 3 nautical miles into the high seas. Within the ports' marine jurisdiction, IPC is responsible for operating the Haifa Port Control, through a VTS (Vessels Traffic Service) system, and employees that are merchant marine veterans or Israel Navy veterans. These employees are part of the marine departments, which are now part of IPC subsidiaries. They are named Haifa, Ashdod Marine Services Ltd.

Nothing in the Shipping and Ports Law 2004 hints to the need, or even the intention, to turn IPC into the landlord at the ports. This is despite the fact that IPC fulfills roles and tasks typical of a landlord in the ports, such as: dealing with sea pollution in the port basins and in the marine territory, maintaining navigation aids at the entrance and exit from the port, managing the information systems (Sea Information Systems), which interfaces with a new foreign trade system belonging to the Tax Authority, ports development, port infrastructure maintenance, etc.

The decision to transfer the marine departments from the Haifa and Ashdod Port companies to IPC is part of the decision to make IPC the ports' landlord. But if the intention is to make Israel Ports the real landlord by the book, then additional activities have to be transferred to it, which are currently under the Corporations. For example, assigning the responsibility for land and sea security to Israel Ports. Nowadays most of the aspects of security are handled by the Security Departments of the Haifa and Ashdod Ports Companies. Also, the Shipping and Ports Authority Act 2004 has to be updated.

In most of the world's ports, the port landlord is the municipal authority, because:

- The municipality knows better than anyone else what is good for the city as far as the port is concerned.
- The municipality has an inherent interest in the success of the port and in increasing its profitability since this improves its own profits and stimulates the growth of the city.
- The municipality will develop the port in various areas according to business plans, the needs of the region and expected profits.
- The municipality is best-positioned to market the port.
- The municipality will safeguard the city residents' interests in terms of dangerous goods, air pollution, and other nuisances which may be caused by the port.

While planning the port reform in 2003 and 2004, a decision was made that Israel Ports Company (IPC) would only fulfill the two main tasks listed above (Shipping and Ports Authority Act 2004). The intention to turn Israel Ports into a full-scale landlord of the ports was scheduled for execution only when the marine departments would be transferred from the Port Companies to Israel Ports Company, even though part of Israel Ports Company activities definitely reflect its status as landlord of the three ports.

Israel Ports Company is a landlord of the three ports (Haifa, Ashdod, Eilat) is an undesirable market failure, especially in the age of the new terminals. In certain

areas, IPC operates with a clear conflict of interests (for example in operating the chemicals terminal in the Haifa Port). Now is the time to consider transferring the landlord status from Israel Ports Company to a different body. I recommend that the option of closing down Israel Ports Company be considered and to transfer all of its tasks, including the landlord status, to a different body.

Following are the main reasons why Israel Ports cannot be a full landlord of the ports.

1. IPC is an administrative body, far removed from the experience of operating ports or issues related to running ports, such as: port operations, port security, marine services, sea pollution, marine navigation aids etc. Israel Ports Company main strength and experience as an administrative body is in control, supervision, using planners, managing statutory processes and so forth. There is no doubt that IPC will have difficulties running marine transport subsidiaries of Haifa Port and Ashdod Port.
2. There is no way of knowing how will IPC market the ports and the terminals? Whom exactly will it market? Which one will it prefer - the Haifa Port Company or the Ashdod Port Company? Which port will IPC prefer as a transshipment port – the Haifa Port Company/Bayport Terminal or Ashdod Port Company/ Southport Terminal?
3. The ports development component can and should be transferred to another body. Any such body that will be selected can do this quickly, efficiently while delivering real solutions for the needs of the country and the respective city. Indeed, this is not a simple task, it's even complicated and difficult, but it can be done. I am in no doubt that the experience that has accumulated in the Israel Ports Company will be implemented among the special port departments that will be set up in the new body that will be selected.
4. It is wrong and misleading to claim that the professional knowledge accrued in Israel Ports Company is priceless and cannot be transferred. The experienced IPC employees can be transferred to the body that will be selected to be the ports' landlord.
5. Shipping & Ports Authority (ASP) will continue to be the ports regulator. A Senior Port Engineering and Operation Division was set up in ASP at the start of the port reform in 2005. This division is responsible for all of the activities in the ports and marinas in the State of Israel. This body might need to be strengthened, as it will be supervising, controlling, serving as the address for user complaints on anything related to the ports and to the operational queue. It is, therefore, clear that I object to the continuation of the existence of the port administrations

which were set up in 2007 as a temporary solution in the agreement between IPC and ASP. There is no need for these administrations and there is no need for regulating port managers. The division that was set up in ASP will fulfill all of the regulatory functions in the ports, ranging from supervision and control of the operational queue, development plans and budgets to proactive accident prevention measures in the ports and setting appropriate standards for the ports.

Conclusion

The ports sector, which is critical to the State of Israel, is about to be reinforced in 202w with two advanced container terminals. This same year the Haifa Port Company should be privatized and in the future the Ashdod Port Company will also be privatized.

The reform of 2005 in the ports was a necessary step in a protracted process of healing the festering ills in Israel's commercial ports (Haifa, Ashdod, Eilat). It is still early to judge the success of the reform in the ports. We are merely 16 and a half years into its implementation and we are still waiting for the private terminals in the Haifa Port (the Bayport Terminal) and the Ashdod Port (Southport Terminal) to begin operations. The successful experiment of allowing the Israel Shipyards Port Company to operate as a private terminal shows that we are on the right course. It will be interesting to see what will happen after the private terminals begin their operations, to be followed by the privatization of the Haifa Port Company and Ashdod Port Company.

The competition we can expect: I have no doubt there will be competition between the various players in the ports sector. The State of Israel needs to ensure that the competitiveness of the old terminals improves so that they will be able to compete against the new private terminals, which are on the verge of beginning operations.

The place of Israel Ports Company (IPC) in general and as a ports' landlord in particular: I recommend that the issue of the continued existence and operation of IPC undergo be given serious consideration, preferably outside the box. This is advisable not only due to the tremendous savings its closure would yield, along with the reassignment of its roles to other bodies, but also due to the fact that it constitutes a market failure and operates with conflicting interests.

Conclusion

Conclusion of Maritime Strategic Evaluation for Israel 2021/22 and Recommendations for Israeli Policy

Shaul Chorev

Insights Summary

Geopolitical and geo-economic changes affecting Israel's area of interest in the maritime domain

Many political, security and economic developments have come together to make a significant difference in the geopolitical map of the meeting area of the three continents, Asia, Africa and Europe. This accelerated the emergence of a new strategic circle that forms a meeting of many international and regional interests, at the core of which are the Red Sea region and the eastern Mediterranean, i.e., the two regions traditionally perceived as separate and independent geographical units, have in recent years become increasingly interconnected in terms of international relations along with the geographical connection that already exists through the Suez Canal.

This relationship is supported by a number of indicators: the first is the significant increase in the value of the various assets being contested by international and regional powers, whether with regard to ports, energy resources or the location of naval military bases. The second is the variety of international and regional competitors in the eastern Mediterranean and the Red Sea, and a large number of regional players. The third is the emerging change in the strategies of competing countries in the region resulting from a deeper understanding of the relationship between the Eastern Mediterranean and the Red Sea, and the attempt to use this relationship to improve their presence on the one hand and reduce the presence of competing countries on the other. It seems that three main factors are contributing to the growing importance of the region: Maintaining international freedom of navigation, the significant increase in the region's ability to provide energy resources and the interest of many countries to ensure their military presence in this strategic circle.[1] Israel must monitor emerging changes and formulate a policy in the domains of maritime trade, freedom and security of navigation, and the utilization of maritime domain for the realization of its strategic objectives.

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1 *EPC*, "The Eastern Mediterranean-Red Sea Region: Stability Pillars and Threats", July 6, 2021.

The main issues discussed below lead to insights that will become recommendations for the political and governmental echelons in Israel concerning the Israeli maritime domain.

Government treatment in Israel on issues related to maritime domain

According to a government resolution dated November 4, 2012, the National Economic Council is tasked with presenting a strategic socio-economic assessment to any new government in Israel within 30 days of its formation. The National Economic Council in the Prime Minister's Office was established in September 2006 in order to meet the need for a professional economic body, with general economic and strategic vision, and with high analytical capabilities, which will act as a staff organ for the Prime Minister. To improve the process of formulating a situation assessment for the 36th government, which began its term in June 2021, it was decided as early as 2018 to promote a process of consulting with experts who will be able to contribute their knowledge and experience to assess the situation. The Maritime Policy & Strategy Research Center has answered a call for proposals regarding the marine component, but to the best of our knowledge nothing has been done on the subject.[2]

The 36th Government of Israel did not include in its basic guidelines a reference to the maritime domain and its development, although on other issues such as the development of Israel's geographical periphery, the government pledged (Article 7) "To do so and to strengthen the economic conditions that enable integration and civic involvement, including through integration in the employment market".[3] In higher education, the government pledged to strengthen higher education, but emphasized the "establishment and budgeting of a university in the Galilee," and not in the context of marine science.[4]

However, it was to be expected that in accordance with a government decision of October 25, 2020, the Inter-Ministerial Committee of Directors established for the Development and Promotion of Haifa Bay would submit in its conclusions certain recommendations corresponding to the government decision of June 7, 2012 approving the establishment of a steering committee for the examination of technological feasibility for building artificial islands in Israel for infrastructure

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2 Ella Weinreb Yaniv, "Moving away from the target: the National Economic Council is looking for a leader". *Globes*, July 2, 2021 [Hebrew].

3 "Guidelines for the Establishment of a Unity Government during the 24th Knesset Term", *Knesset Website*, Guidelines and Coalition Agreements, Article 7 [Hebrew].

4 Ibid, Article 20.

purposes. The committee formulated a recommendation document summarizing its work and recommended "setting a government goal that within a decade the preparation of all government bodies will be completed so that the activity of the petrochemical industry in Haifa Bay will cease."[5] Unfortunately, none of the alternatives is exploring the possibility of evacuating some of these infrastructures and placing them on artificial islands, a topic that has been examined many times by The Maritime Policy & Strategy Research Center in recent years.

The regulation of government policy in Israel's maritime domain – the plan of former Finance Minister Moshe Kahlon to establish the "Marine Authority" did not materialize and after he left office, the Planning Administration returned to being an auxiliary unit of the Ministry of Interior. The policy document for Israel's maritime domain in the Mediterranean, which was distributed in December 2018 by the Planning Administration, was not approved by the Israeli government. At this stage, a team of inter-ministerial general directors has been established to handle the recommendations and turn them into a plan.

Our insight on this issue is that the correct order is to start formulating a maritime policy and strategy for Israel's maritime domain, and only after the maritime policy, objectives and strategy are approved by the government will the Maritime Spatial Planning be approved.

Development and protection of Israel's gas resources

In 2021, regular gas supply from the Leviathan Field began, and in the second half of 2022, supply from the Karish Field will also begin. Contrary to forecasts, in the fall of 2021, world natural gas prices soared. It should be kept in mind that this is an energy market that has no safety margin (i.e., storage capacity), so it is very sensitive to any disruption. The withdrawal from investing in energy produced from hydrocarbon fuels means that there are no alternatives, and accordingly, the future is also expected to be volatile. It is estimated that by 2024, the demand for gas will increase by 7% compared to the period before the Covid-19 pandemic, while the demand for Liquefied Natural Gas (LNG) that can be transported by ships is expected to grow by only 3.4% each year until 2035.

The East Mediterranean Gas Forum (EMGF) was established in September 2020 as a joint initiative of Israel and Egypt, following discoveries of natural gas in the

5 "Recommendations of the CEO Committee for the Promotion and Development of Haifa Bay", Prime Minister's Office, National Economic Council, April 26, 2021 [Hebrew].

Mediterranean. For the past year and a half, the Ministry of Energy has worked with Italy, Greece, Jordan, Egypt, Cyprus, and the Palestinian Authority to establish the organization and formulate its constitution, which was signed with initials in January 2020 by the members' energy ministers. In order to make a forecast for natural gas demand for the Israeli economy until 2045, a team led by the director general of the Ministry of Energy examined the need to explore additional natural gas reserves in the next decade, in order to maximize gas production potential before the 'window of opportunity' closes and gas remains unused. According to the team examining the government's policy on the gas economy, if Israel does not act this way, it could lose up to NIS 230 billion in direct gas revenues – from royalties, income tax and the taxation of permit profits ('Sheshinsky Tax').[6]

Our insight on this issue is that the program of exploration and production of gas reservoirs in the maritime domain must be continued until the program for meeting the goals set by the government with regard to alternative energies is of a high level of reliability.

In 2021, the Israeli government has set a new target of 30% for electricity generation using renewable energy by 2030, but this target seems very ambitious. Israel does not meet the moderate intermediate targets it has set for itself for 2020 (reaching 10% of electricity generation using solar and wind). The conclusion is that it would be right to continue with additional gas exploration at sea alongside the development and construction of facilities for the production of renewable energy.[7] As for the situation of the "Wealth Fund": a report by the Knesset Research and Information Center states that the expectation of the Bank of Israel that NIS 3.8 billion will be transferred to the Gas Profit ('Wealth Fund') in 2018-2022 is excessive, and actual revenues, at best, will reach only NIS 1 billion at the end of 2021". The reason: additional costs that were recognized for the Tamar reservoir as "search and development" expenses.

Protecting Israel's energy production infrastructure: In Operation Guardian of the Walls in May 2021, Hamas fired rockets at the Tamar rig, launched an unmanned aerial vehicle intercepted by the Israeli Air Force, and attempted to launch an unmanned submarine that was destroyed on the shoreline. At the beginning of the escalation, the Ministry of Energy, in consultation with defense officials, ordered the shutdown of operations at the Tamar rig and an additional energy infrastructure

6 Anat Roa, "The price of non-production of gas: NIS 230 billion", *Calcalist*, June 2, 2021 [Hebrew].

7 "Energy Economy Goals for 2030", Executive Summary, State of Israel Ministry of Energy, 2018 [Hebrew].

facility. This move drew criticism from the defense establishment, claiming that the Navy's mission is to protect these facilities even in emergencies, and to allow their operation to continue (as was the case in Operation Protective Edge).[8]

In the budget allocated for securing Israel's EEZ that was approved for the Navy, the Navy undertook to protect and enable the continuous operation of the energy infrastructure against a sudden attack, or during a regional campaign.

Our insight on this issue is that over time new threats develop that are not necessarily the threats against which the current Navy Order of Battle (e.g., Sa'ar corvettes – 6) was built, and that the naval arm must think of an appropriate response against diverse scenarios including protection of Karish and Tanin fields when activated.

The purchase order of the Navy's submarines and surface vessels

In July 2021, Israel's High Court of Justice rejected petitions requesting the establishment of a commission of inquiry in the "3000 case" (the purchase of submarines) and the opening of a criminal investigation against former Prime Minister Benjamin Netanyahu in the stock case. In the vessel case, the court insisted that from a legal point of view the decision to set up a commission of inquiry should be made by the government, and the court's intervention in this decision is exceptional and rare. However, the court has raised a number of unanswered questions, noting that apparently, the decision-making processes among the relevant authorities is worrying – and these doubts deserve a public response. Defense Minister Benny Gantz said after the decision that "the criticism of the High Court of Justice regarding the shortcomings in the process of purchasing the submarines and vessels, and the situation in which the IDF and the defense establishment were pushed aside in the decision-making process, requires an in-depth examination of the issue", and added that "I will continue to lead, together with my partners in the government, the establishment of a national commission of inquiry soon."[9]

Our insight on this issue is that regardless of the process of appointing or not appointing a national commission of inquiry, the defense establishment and especially the Navy, must investigate all procurement processes while emphasizing control and conflicts of interest issues, to ensure such incidents do not recur in the future.

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8 Amir Bohbot, "The IDF prevented attempts to attack the Tamar gas rig during the 'Guardian of the Walls'", *Walla*, May 16, 2021 [Hebrew].

9 Matan Wasserman, "The High Court of Justice Rejected the Petitions Demanding the Establishment of a Commission of Inquiry in the Submarine Case", *Maariv*, July 22, 2021 [Hebrew].

Challenges of Israeli sailing in the Red Sea and the Arabian Sea

Since the beginning of 2019, the naval arena was added to the air and intelligence campaign when reports of mishaps and explosions in Iranian ships began to spread around the world, mainly about oil tankers on route to Syria. At the time, the issue was not related to Israel and it was probably also convenient for the defense establishment to ignore the Iranian messages that these actions will not go unanswered.[10] Israeli companies engaged in maritime trade assumed several years ago that the non-affiliation of ships to the State of Israel would lead to their immunity against any harm, including Iranian harm, which has been proven in recent events as an incorrect assumption. When these companies turned to the appropriate authorities in Israel for instructions on how to act under this situation, the instructions they received suggest that the bodies that allegedly approved the naval campaign against Iran did not take into account such a response, i.e., they applied only operational thinking without examining strategic implications. The vessels were left without an adequate response.

On the night of July 29-30, 2021, Iran struck for the fourth time off the coast of Oman the Japanese-owned *Mercer Street* tanker, operated by the Zodiac company owned by the Israeli businessman Eyal Ofer. Unlike previous attacks that ended in no casualties, two crew members were killed in the attack. Iran has not explicitly accepted or denied responsibility for this, but a state-owned television channel described the attack on the ship as a response to an Israeli attack sometime earlier at a military airport in Syria. It should be noted that in early July, a cargo ship formerly owned by the Zodiac Company was apparently accidentally attacked by Iran in the Indian Ocean. According to a number of testimonies the attack in late July was apparently carried out by several Iranian drones that crashed near the crew quarters located near the command bridge.

Since this was the fourth attack on ships that are managed by an Israeli company, and which is part of a campaign that Israel has allegedly begun to conduct against Iran in the maritime domain in the last two years, it is worth asking two questions: first, how much do these actions contribute to Israel's campaign against Iran's nuclear program (or what is the measure of the strategic effectiveness of such actions), and the second, whether the political echelon that approved the implementation of these actions took into account the possible reactions of the Iranians against Israel in the maritime domain, a domain in which Israel depends entirely on its

10 Daniel Avis, "Understanding the Shadow War Between Israel and Iran". *Bloomberg*, August 4, 2021.

trade with countries worldwide. There is no doubt that at the operational level, if Israel is behind the attacks, these are bold and successful actions that deserve much praise. However, this is a clear example of the decision-making process in the Israeli defense establishment that was carried out at the operational level only without examining the broader implications at the strategic level for this type of activity. It is worth noting that the response attributed to Iran mentioned above, took place in areas far from Israel, where the capability of the Israeli Navy to respond is limited, while it exposes Israeli shipping in the Red Sea, the Gulf of Aden and the Persian Gulf (Including tankers transporting fuel to the EAPC in Eilat) to risks that Israel has difficulty dealing with. To address this limitation, Israel has decided to tighten its cooperation with the United States Fifth Fleet (a move that the Maritime Policy & Strategy Research Center recommended more than a year ago).[11] Apart from the operative steps taken, this was also reflected in the diplomatic arena, during the well-publicized visit of Israeli Foreign Minister Yair Lapid to Bahrain on September 30, 2021.[12] During that visit, Lapid met with the commander of the Us Fifth Fleet, Vice Admiral Brad Cooper, on board *USS Pearl Harbor*, and discussed cooperation facing the Iranian threat against Israel, and stated that "when we talk about peace, we need to remember that peace must be protected from those who would harm it".[13]

Our insight on this issue is that in the context of what the IDF calls the campaign between the wars (CBW), the strategic implications of operations in the maritime domain and their broad implications (including on Israeli trade) should be examined, and only afterward – make a decision. Since the naval campaign in the southern Red Sea and Arabian Sea is beyond the independent naval capabilities of the Israel Navy, operational collaborations with friendly navies and especially the US Fifth Fleet and Central Command should be stepped up.

Demarcation of maritime borders with Lebanon

In May 2021, talks resumed on the issue of the maritime border with Lebanon between the Israeli delegation and the Lebanese delegation mediated by Ambassador John Desrocher at the UNIFIL base in Naqoura, but they did not lead to any progress.

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11 Shaul Chorev, Douglas Feith, Gary Roughead, Seth Cropsey, Jack Dorset, *The Eastern Mediterranean in the New Era of Major-Power Competition: Prospects for U.S.-Israeli Cooperation*, Hudson Institute & HMS, September 2019, pp. 37–38.

12 Shaul Chorev, Douglas J. Feith, Gary Roughead, Seth Cropsey, Jack Dorsett, "Why does US Central Command now include Israel? – opinion". *The Jerusalem Post*, January 28, 2021.

13 "Top Israeli diplomat visits Bahrain, U.S. navy base in signal to Iran", *Reuters*, September 30, 2021.

The purpose of the Israeli delegation, as defined by the then Minister of Energy, Dr. Yuval Steinitz, was "to examine the possibility of reaching an agreement on the determination of the maritime border between the countries and to find a solution that will enable the development of natural resources in the region for the benefit of the residents of the region".[14] Despite the lack of progress in the negotiations, the Maritime Policy & Strategy Research Center has been arguing for more than two years that the solution to the dispute over the maritime border with Lebanon should be through US-mediated political negotiations.[15]

Until October 2020, the dispute with Lebanon was over an area of approximately 860 square kilometers located between Rosh Hanikra and the middle of the sea between Israel and Cyprus. It seemed that the dispute was more or less defined and that the solution based on the division of 45% of the territory to Israel and the rest to Lebanon was probably agreed upon. But then, in October 2020, the Lebanese delegation surprised Israel and the American mediator with a new demand that expanded the disputed area by additional 1,400 square kilometers. The Lebanese justified their new position by saying that the new borderline they drew meets, in their opinion, the requirements of international law – the Convention on the Law of the Sea.

One of the obvious reasons for the dramatic change in the route of the border line was the Lebanese desire to gain a foothold in the Karish reservoir, which is under the control of Israel. The new route they drew is stretched in a more southerly direction crossing the reservoir at its center. The Lebanese are now seeking not only to demarcate the maritime border with Israel but also to discuss the terms of the partnership and the exploitation of the reservoir, and they have even threatened that if their requests are not answered they will turn to international courts to claim their rights.

In the fall of 2021, President Biden appointed Amos Hochstein, a Senior Advisor for Energy Security in to the US State Department, as the new mediator between Israel and Lebanon on the issue of the maritime border and the dispute over Mediterranean

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14 Announcement by the Ministry of Energy Spokesman, "The Israeli delegation for talks regarding the maritime border between Israel and Lebanon", *Ministry of Energy website*, May 4, 2021 [Hebrew].

15 Benny Spanier, *In Peaceful Ways, Examining the Dispute on the Maritime Border between Israel and Lebanon in the Mirror of Maritime Law* (Haifa: The Maritime Policy & Strategy Research Center, University of Haifa, July 2019) [Hebrew].

gas reserves. He is expected to arrive in the coming months for the first round of talks in Beirut and Jerusalem.[16]

One of the significant points of contention with Lebanon is how Israel's coastline is drawn. The Lebanese, rightly, claim that the current law in Israel defines that the maritime areas are measured from the low tide of the sea on the coast. They say that this makes it easier for them to draw a border line route that also includes the Karish reservoir. Israel, for its part, creatively it must be said, defines the coastline differently, so that it is significantly moved to the west of the coastline. This affects the location of all maritime areas, its borders and of course the location of the reservoirs relative to the border. But this line, as stated, is currently not valid and makes it difficult for Israel to deal with Lebanon's claims.

Our insight on this issue is that Israel should continue negotiating, but at the same time it should define its borders and authority at sea, and show that the maritime domain is not open for everyone and that as a littoral country, it has "maritime awareness" rather than "maritime blindness".

Israel's Accession to the United Nations Convention on the Law of the Sea (UNCLOS)

In light of the changes in power in the United States and the Biden administration's agenda of returning to international agreements, it is possible that the administration will try to promote a number of international conventions and agreements, including human rights treaties, environmental agreements, arms control agreements, and UNCLOS.[17] In this context, but not only, the Maritime Policy & Strategy Research Center held a closed workshop in March 2021, in order to examine whether this is the right time for Israel to join the Convention. Although this is presumably a legal matter, the pros and cons are broad and related to geopolitical issues.

A number of reasons have led to Israel not joining UNCLOS so far. These include the historical reason for the PLO signing the Convention; a mandatory arbitration mechanism in the Convention for resolving conflicts; the difficulty of Israel's military to act at sea against terrorism in light of the Convention; the degrading of Israel's

16 Barak Ravid, "Biden confidant to mediate Israel and Lebanon's maritime border dispute", *Axios*, October 2, 2021.

17 Steven Groves, "Key Treaties That Threaten American Sovereignty, Which the Senate Must Oppose During the Biden Presidency", *The Heritage Foundation*, Issue Brief No. 6045, Margaret Thatcher Center for Freedom, January 28, 2021.

freedom of navigation through the Straits of Tiran (compared with the freedom it obtained in the peace treaty with Egypt) as well as the non-accession of the United States to the Convention.

A variety of opinions and issues arose in the workshop. From the political and public relations point of view, it would be appropriate to join UNCLOS as a symbol of supporting the abstract idea of the rule of law, especially with regard to law-making conventions for the international community and as a mark of supporting the goals of the Convention. As for the actual policy, the question of advantages and disadvantages arose. On the one hand, joining UNCLOS does not increase the IDF's scope of operational activity at sea. On the other hand, there was concern about the use of the conflict resolution mechanism to challenge Israeli military activity. Although the obligatory mechanism can be bypassed there is no certainty and it should be borne in mind that such harm is possible. The same applies to the demarcation of maritime borders. On the one hand, there is a concern that Israel's neighbors might initiate an arbitration process, but on the other hand, there are those who believe that joining the Convention will actually make it possible to challenge the neighboring countries and promote the resolution of this matter. Concerning freedom of navigation, it is clear that Israel has other means for dealing with a possible attempt to limit its freedom of navigation in the Straits of Tiran. There is an understanding that the solution lies in settling relations with the relevant countries and not in the legal status. The accession to the Convention can actually be beneficial as it is the common normative basis to understandings.

Does Israel need the Convention in order to conduct its activities in the maritime domain on the issue of gas? The speakers insisted that Israel already has powers over the EEZ. It takes into account the customary aspects and the state regulation, thus it can continue without joining UNCLOS. However, the creation of a clear normative infrastructure of the Convention will encourage companies and corporations to join and participate in the search for resources, given the stability and certainty. Here, too, the promotion of the Marine Areas Law could constitute another aspect in the consideration of whether to join the Convention.

Our insight on this issue is that the arguments for and against Israel's accession to UNCLOS are not conclusive and therefore we must continue to engage in the subject while creating a dialogue and thinking about the various issues – opportunities and risks – between academia, researchers and government. It will allow the identification of the correct time for accession to UNCLOS and would allow Israel to promote this move at the appropriate time.

The relationship between Israel and Turkey

In recent months, and especially since the 36th Israeli government took office, Turkey has been trying to get closer to Israel. This was particularly noticeable in the telephone conversation between President Recep Tayyip Erdogan and Israel's President Isaac Herzog that took place on July 12, shortly after Herzog took office. We have recently witnessed a meaningful decline in the rate of anti-Israel condemnation by the Turkish Foreign Ministry, and Turkey was one of 52 countries that supported a joint declaration by the Abraham Accords countries – Israel, UAE, Bahrain and Morocco – on women, peace and diplomacy. It should also be noted that the volume of mutual trade between Israel and Turkey in 2020 stood at $5.75 billion ($1.41 billion in exports and $4.34 billion imports), a figure that reflects a slight decrease of approximately 0.2% compared to 2019, but it reflects tight and continuous relations.[18] The Maritime Policy & Strategy Research Center held a number of conferences on Turkey and its conduct in the Eastern Mediterranean. In addition, in February 2021 – with the assistance of the Israeli Representation in Ankara – the Center signed a cooperation agreement with the Turkish Institute (Türkiye Enerji Stratejileri ve Politikaları Araştırma Merkezi – TESPAM) based in Ankara.

Our assessment is that Erdogan's reaching out to Herzog is a signal of seriousness on the Turkish side, which deserves attention on the Israeli side. Of course, the Turks must understand that it will not be possible to bypass the office of the Prime Minister of Israel, Naftali Bennett, and no Israeli institution should create the impression that this is possible. Moreover, Israel must make it clear that any progress made in relations with Turkey will not come at the expense of its relations with Greece, Egypt or the United Arab Emirates. However, Israel should support a political settlement (and not only according to UNCLOS) regarding the dispute between Turkey and Greece in determining their economic waters. Israel must make it clear to Turkey that the incident of the expulsion of the research ship *Bat Galim* by the Turkish navy ships is unacceptable to Israel as the consequences of such an event could be far-reaching with regard to freedom of navigation to and from Israel. Future cooperation between Turkey and Israel could be built around the activities of energy companies in the region, which due to diplomatic and security importance is likely to receive the blessing of the US administration despite its policy of reducing the development of fossil fuel reserves around the world. In addition, cooperation in all the countries of the region can be promoted in the domain of environmental security that does not distinguish between maritime borders, and will provide

18 "Israel-Turkey Mutual Trade Data", Ministry of Economy and Trade, May 25, 2021 [Hebrew].

a solution to events such as seawater pollution, maritime accidents and natural disasters. After building a relationship of trust between the countries of the region, it will also be possible to settle the demarcation of maritime borders in the eastern basin of the Mediterranean. This is a complex process, but Israeli decision-makers need to understand that despite its relations with Greece and deep understandings with Egypt, Israel will not be able to export gas to Europe without close coordination with Turkey, which serves as one of its important energy corridors. However, Israel and Turkey, two countries that are not signatories to UNCLOS and are known for their preference for political solutions over the involvement of international bodies, could actually be the ones to promote it. Turkey is on a path of rapprochement with Egypt and the prospect of an end to the civil war in Libya after the general elections in the coming year may alleviate regional tensions.

Our insight on this issue is that it is very important for Israel to address the change that has taken place in its strategic position in the Middle East upon the transition of power in the United States. What Israel and Turkey have in common is that in the past both have been allowed to advance a pressure-free regional policy with the blessing of President Trump. Nowadays, Turkey will not be able to operate in the eastern Mediterranean as it has in the last two years of President Trump's tenure. This situation should increase cooperation between Israel and Turkey, and both will have much to gain from it.

The domain of Shipping and Ports

Israeli Ports: In the previous annual report we pointed out that despite the crisis created by the Covid-19 pandemic, Israeli ports were able to adapt their operation and adopted a new regime of labor, hence Israeli citizens experienced almost no mishaps in the field of import and export. However, if the outline of an epidemic is replaced by a security event such as rocket and missile fire on Israel, it is likely that merchant ships that do not carry the Israeli flag, or are not Israeli-owned, will stop visiting Israeli ports. In our opinion, the ports and merchant fleets intended for transporting vital supplies to Israel in an emergency are part of a national infrastructure that a state like Israel must maintain in one way or another due to its unique situation.

At the beginning of September 2021, the Haifa Bayport was inaugurated, which will be able to accommodate huge ships carrying up to 18,000 containers. The Chinese company SIPG, which is responsible for operating the port, has not yet signed on regular lines with the large shipping companies; therefore, full operation of the port will only begin in 2022. The operation of the Southern Port within the Port of Ashdod

is also expected to begin during 2022, which will add an essential infrastructure for Israeli trade. Despite this, since March 2021, heavy traffic has been recorded at the entrances to the ports in Ashdod and Haifa (a fact we have already pointed out in previous situation assessments). According to data from the Israel Port Company, waiting times have increased significantly and dozens of merchant ships are waiting for many days to get service.[19] In April 2021, the Chamber of Shipping of Israel, The Federation of Israeli Chambers of Commerce, Manufacturers Association of Israel and the Council of Carriers contacted the then Transport Minister Miri Regev, claiming that the ports had an "operational state of emergency" and that the average waiting time for bulk carriers was almost 20 days (see Figure 1).

Our insight on this issue is that efforts should be directed to streamline port activity in the areas of general cargo ships and bulk carriers (ships carrying bulk cargo, such as grain, coal and metal ores).

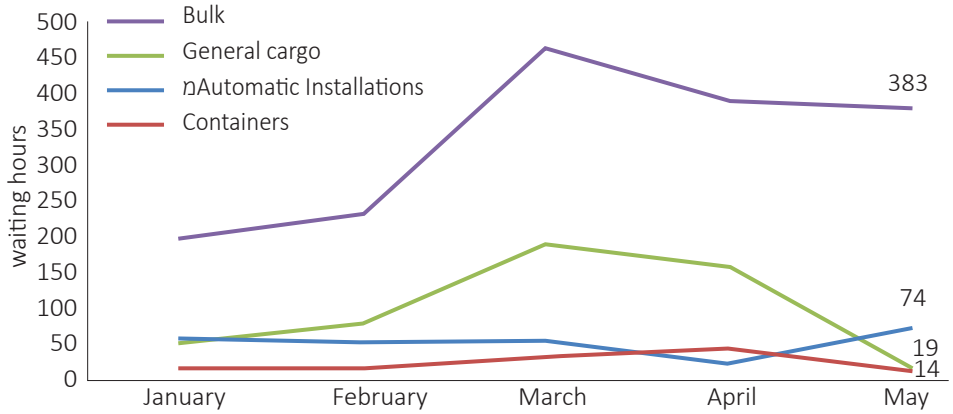

Figure 1: Average waiting hours at the ports of Haifa and Ashdod according to the type of cargo in 2021

Israeli shipping

The situation of Israeli shipping continues to be bad, both in terms of Israeli manpower serving on the ships, the number of ships owned by Israelis or carrying the Israeli flag, and in relation to the new taxation law (occupancy tax) promoted by the Ministries of Finance and Transport. The law, which was supposed to enter

19 "The estimated Impact of Congestion in Israeli Ports on the Economic Activity in Israel's Economy, September 2021", *Ministry of Finance, Division of Chief Economist*, September 2021, pp. 1–3 [Hebrew].

into force in January 2017, has been rejected, and now approving the law must start from square one, including the approval of the government and three readings in the Knesset. The law was supposed to encourage the acquisition of Israeli ships, and "save Israeli shipping from certain extinction".[20] The intention of the law was for a shipping company to pay tax for the occupancy of the ships it operates and not for its profits.

Despite this, the shipping company ZIM reported record results for the second quarter of 2021 and a 44% increase in the volume of container transport – significantly higher than the growth in the market, and that the results of the second half of 2021 are expected to exceed the results of the first half. This indicates that proper management of the company, utilization of opportunities and correct strategic vision (the increase in transportation prices worldwide by more than 200%), make it possible to achieve nice achievements.[21] It should be remembered that in 2004, the Israel Corporation purchased the remaining shares of ZIM owned by the government, thus completing the privatization process of ZIM. The current ownership structure was determined after extensive reorganization processes conducted in 2014. The state does not take care to maintain the 'gold stock' that is allegedly in its hands.

Our insight is that changes in the world's and Israel's shipping industry are occurring, so even if the policy set at the time of ZIM's privatization is no longer relevant, a new policy must be adopted as part of Israel's maritime strategy, after all meanings have been understood and not as a default. The Marine Institute for the training of naval officers should maintain the professional knowledge in both the deck and machine majors and adapt it to new ships (new types of propulsion and advanced navigation systems).

The State of Israel as a startup nation in the maritime domain

Approximately 80% of the world trade is conducted at sea, and the marine domain-based economy produces $3 trillion in services and products each year. Despite the impressive data, the world of innovation as well as startup companies in Israel are still not fully utilizing the vast resources that exist in this domain. When compared to a number of ventures in other industries, marine technology in Israel is still in

20 "$110 billion has been deleted, the rules have changed and a new era has opened", said Yoram Zeba, the President of the Chamber of Shipping for the fifth shipping day, October 23, 2018 [Hebrew].

21 "ZIM at a New Peak: Net Profit of $888 Million for the Quarter," *Port2Port System*, August 19, 2021.

its infancy. In the Maritime Strategic Evaluation for 2017/18, the issue has been examined in an article entitled "Can Israel Become the Startup Nation for the Maritime Domain?"[22] The main recommendations of the article were: to recognize the shipping and ports sector as a developing technology sector, allocate resources and funds to support the domain, integrate Israeli marine technologies in global and regional projects and initiatives, focus on the urban level, and act as an attraction for global players.

In September 2020, the inter-ministerial committee dealing with the maritime domain and the development of the 'blue economy', headed by the Director General of the Planning Directorate, and the presence of the Chairman of the National Planning and Construction Council, approved a plan for developing a marine technology business community in Haifa. The committee's decision stipulates that the Haifa Municipality, together with the School of Marine Sciences at the University of Haifa and other stakeholders, led by the Planning Directorate, will develop a multi-year strategic plan to establish a National Marine Innovation Center including a physical, entrepreneurial, economic, structural and international action plan. The National Innovation Center will be established according to the plan in the Innovation District near the port, and will be a vibrant center of activity, which also includes marine activities with academic, economic, engineering and security cooperation.

Our insight is that the move of the inter-ministerial committee dealing with maritime domain is in the right direction, but should be accompanied by additional steps from other government bodies like the chief scientist of the Ministry of Science and the Innovation Authority dealing with research and development at the national level.

Preparing to deal with cyber-domain threats

The global economy is almost entirely dependent on maritime trade and the consequences of disruption to the maritime supply chain following a cyber-attack are not limited to a number of raw material-dependent manufacturing industries but affect a large number of goods that depend on this supply chain. The emergence of cyber threats as part of the asymmetric and hybrid warfare in the maritime domain, both in terms of information technology and in terms of operational technology, while using private and advanced technologies in order to achieve strategic value, makes the naval arena extremely vulnerable. In the recent decade, shipping, ports,

22 Hannan Carmeli, "Can Israel Become the Startup Nation for the Maritime Domain?" *Marine Strategic Evaluation for Israel 2017/18* (Haifa: The Maritime Policy & Strategy Research Center, University of Haifa, 2018), pp. 210–217.

and gas and energy production facilities have become very dependent on computer and control systems based on operational technologies that cause difficulty in analyzing the consequences and losses actually caused by maritime cyber-attacks.

Planning the response to the cyber threat in the maritime domain should be reflected in the training, construction of counter-technical tools, and operation at the level of necessary organization for cyber protection in that vessel. The thinking or planning should be integrated into the traditional naval structure.[23] At the first cyber conference in Israel held in July 2021 in the port of Ashdod as part of the Israeli Cyber Week, Yigal Unna, head of Cyber Israel – National Cyber Directorate, said that "one of the advantages we have in Israel as a startup nation is that everything is close and everyone knows each other, and that is a huge advantage in the field of cyber defense". He added that "we need to run faster, promote the existing Israeli cyber ecosystem and create information sharing and partnerships that have already been proven to be the best tools for dealing with cyber challenges. The entire global marine system is already connected, we need to ensure fast and transparent cooperation for everyone".[24] Our insights are that a conference on cyber threats in the maritime domain held at the Israeli Cyber Week is the right step in enhancing awareness of threats in this domain and encouraging international cooperation, but it requires complementary steps such as publishing policies for the Israeli ports and shipping sector and monitoring their defense plans against cyber threats.

The State of Israel's preparation for disasters in the maritime domain

The marine pollution disaster in tar along the shores of Israel that began on February 17, 2021, was a medium-level marine pollution event. It affected beaches, the sea and nature along all of Israel's Mediterranean shores. During the incident, marine waste of tar originating from crude oil was discharged to the shores of Israel. After about a month, the Ministry of Environmental Protection reduced the state of emergency status on the beaches to level 1, and allowed the public to return to most of the beaches.[25] Following the incident, the Ministry of Environmental Protection submitted a memorandum of the Law of National Plan for Preparedness

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23 Peter Dombrowski and Chris C. Demchak, "Cyber War, Cybered Conflict, and The Maritime Domain", *Naval War College Review*, 67(2), (2014), p. 7.

24 Lior Novik, "For the First Time in Israel: An International Conference of Experts in the Field of Marine Cyber", *Maariv*, July 29, 2021.

25 "Tar in a storm: The Ministry of Environmental Protection is working to locate the source of the severe sea pollution that flooded the shores of Israel with tar", *The National Unit for Marine Environmental Protection*, Ministry of Environmental Protection, February 22, 2021 [Hebrew].

and Response to Marine Oil Pollution Incidents, designed to address similar future incidents regarding the "preparation of emergency plans, the establishment of a rapid response system using equipment, ships and skilled personnel to handle marine oil pollution, as well as the establishment of an international cooperation mechanism".[26] The Maritime Policy & Strategy Research Center in collaboration with the Minerva Center for the Rule of Law under Extreme Conditions at the University of Haifa reviewed the memorandum of the proposal for the law, found it incomplete in several areas, and submitted their reservations to the Ministry of Justice.[27] In order to deepen the understanding of the way of handling such scenarios, this topic was chosen as the theme of the annual conference of the Wydra Division for Shipping and Ports held in September 2021.

Our insights on this subject are: The sea is a unique domain in many aspects and the operation in the marine environment requires professional expertise and dedicated tools. Today, most of the capabilities of State of Israel in the maritime domain are held by the Navy, while the other bodies (Israel Police, Fire and Rescue and Environmental Protection) usually have specific capabilities that are more limited than those required to handle a large-scale incident. The event should be defined as a "civil emergency", which means: "an event that causes serious harm to public safety, security of mind or property relating to a large public or large area, or an event in which such harm is feared, including due to natural hazard, environmental hazard, dangerous goods event, chemical or biological event, radiological event, accident or hostile terrorist activity".[28]

There is no Coast Guard in Israel as in other countries that deals with policing, rescue, handling of dangerous goods incidents and more. Israel needs to have one body to manage its maritime domain and monitor the maritime status. Such a body would be responsible for including the policy for the maritime domain and for regulating its activities on a routine basis and would also be responsible during an emergency event. In the current situation in Israel, only the Ministry of Defense (through the IDF and the Israeli Navy) and the Ministry of Internal Security (through the Israel

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26 "Memorandum of the Law for Preparedness and Response to Marine and Coastal Environment Pollution in Oil Incidents, 2021", *Ministry of Justice, Government Legislative Website*, March 29, 2021 [Hebrew].

27 Ibid. "Comments of The Maritime Policy & Strategy Research Center HMS, The National Knowledge and Research Center for Emergency Readiness and the Minerva Center for the Rule of Law under Extreme Conditions for the Memorandum of Law."

28 Law Amending the Police Ordinance (No. 34), 2018, Law Book 2701 of 12 March 2018, on the Knesset website [Hebrew]

Police) are able, after settling the issue, to manage a civil emergency at sea. Given the capabilities developed by the Navy due to the need to protect the EEZ (and the many resources allocated to it), it seems that the Navy should be responsible for monitoring the maritime situation, while the first responders will act according to their areas of responsibility. The Law of National Plan for Preparedness and Response to Marine Oil Pollution Incidents should expand preparations for dealing with a wider range of civilian emergencies in Israel's maritime domain.

Preparing for climate change

According to the report written by the Intergovernmental Panel on Climate Change (IPCC), pollutant emissions have led to an increase in extreme weather events – which are expected to continue rising rapidly in the coming years. "Many changes are unprecedented in thousands, if not hundreds of thousands of years. Some, such as continued sea-level rise, are irreversible over hundreds to thousands of years." This report, as well as previous ones, estimate that by 2041, the average temperatures on Earth will be 1.5 degrees Celsius higher than in the Industrial Revolution.[29] The report warns that extreme events – such as heat waves, long droughts and heavy rains – will become more frequent and more extreme as the earth continues to warm up. The expected changes in our region will be: an increase of 4° Celsius (compared to the average of 1988 – 2017), a reduction in the amount of precipitation by an average of 10%-20% by the end of the century, increased extreme weather events such as heat loads, flooding, floods and torrential rains, as well as an increase in sea level at a rate of 4 mm per year. In 2020, for example, a number of cities were flooded during the winter, floods that also claimed human lives, and in the summer, temperature records were broken by prolonged heat waves.[30]

The Ministry of Environmental Protection established the inter-ministerial directorate by virtue of a government decision from July 2018, and its designation is presenting to the decision-makers all the currently available information on the subject and act to implement for the security of comprehensive national preparations. The directorate's Report No. 1 on geo-strategy and economics states that the impact of these changes on neighboring countries may lead to strategic

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29 The quote is from the United Nations Climate Change page: The full report: *Intergovernmental Panel on climate change IPCC*, "Climate Change 2021, The Physical Science Basis Summary for Policymakers", Working Group I contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.

30 Alon Zasak and Sharon Rahav, "The State of Israel's Preparation for Climate Change - Report No. 1" *Ministry of Environmental Protection*, April 2021 [Hebrew].

threats and migration pressures in the affected areas. Water scarcity in neighboring countries could provoke regional conflicts over control of water resources, as well as to achieve peace agreements that include a commitment to supply water. Since the Middle East is characterized by geopolitical instability, the expected changes may have a more significant impact on the region's inhabitants. In the domain of coastal infrastructure (the only issue that directly relates to the maritime domain), this may lead to the retreat of the coastal cliff that will lead to the expansion of the area of risk to human life and the coastal infrastructure and assets built on and adjacent to it. Tourism and camping and holiday activities on the beaches are expected to be negatively impacted. Coastal structures and heritage sites might be damaged by the rise in the sea level.[31]

The directorate identified for the Israeli government key issues on which a policy should be formulated. Our insight is that the directorate's plan is partial and limited in scope, and does not address the impact of climate change on Israel's maritime domain as a whole. It is necessary to deepen the understanding of the links between effects and climate change and threats to maritime security, and it is necessary to conduct research on the interaction between climate change and maritime security and convert the research findings into policy documents. In order to examine these issues in Israel's maritime domain, it is appropriate that the Maritime Policy and Strategy Research Center will be represented in the directorate's strategy committee, which determines which projects will be given priority for budgeting and implementation in the immediate term, so that these issues will be mapped and handled.

Marine schooling and academic education in Israel

Following the increase in the importance of the sea component in Israel's security and resilience, the Mediterranean Sea Research Center of Israel was established in 2012. It is a consortium consisting of seven research universities, one college and two government research institutes, led by the University of Haifa. The consortium did not get a proper budget increase in 2021, thus effectively stopping the required expansion of its activities in the domain of Eastern Mediterranean research.

The Strategic Advisory Team for the University of Haifa, headed by Professor Joseph Klafter, former President of the Tel Aviv University, notes in this context that "the development of the marine sciences, which was founded over a decade ago with an impressive investment, has slowed down later on. An expanded and renewed

31 Ibid, p. 23.

Faculty of Natural Sciences, which will be discussed later, has great potential and a central place in correcting this situation, in promoting research at the university and in strengthening its position compared to other institutions".[32] The committee's recommendations in relation to marine science state that "this domain places the University of Haifa in a unique key position on a national and international scale, and its further development with great momentum is required and necessary. Accelerating research activity in existing and new fields of marine science, including connections to other fields of knowledge, will require new magnitudes of resource investment. Such an investment cannot be based solely on internal sources, and it would be appropriate to harness the support of the Planning and Budgeting Committee within the Council for Higher Education as well."[33]

Our insight is that given the independent status of the School of Marine Sciences at the University of Haifa, it is important that the curriculum in "Security and Marine Strategy" which operates as an independent program, will come under the School of Marine Sciences.

Education and training of officers in the Israeli Navy

The Master's Degree Program at the University of Haifa on National Security and Maritime Strategy is an appendix program of the International Relations Division at the School of Political Science at the University of Haifa. The program is entering its fourth year, and is perceived as a prestigious program. The importance of the subject and the need to train future researchers in this domain requires it to be transformed into an independent program in the academic year 2022/23 and be included in the university's five-year programs.

During a visit by the Navy Commander on March 7, 2018, with the participation of senior officials at the Naval Headquarters at the Marine Policy and Strategy Research Center at the University of Haifa, he concluded that "The master's degree program in national security studies and naval strategy for naval officers who are graduates of a naval cadets course should be attractive, and its target audience will include seafarersץ It will last two years and include a research track".[34] Accordingly, the

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32 "Recommendations of the Strategic Advisory Team to the University of Haifa" are submitted to the President of the University of Haifa, Prof. Ron Rubin, and to the University's Management, 2021, p. 13. [Hebrew]

33 Ibid, p. 14.

34 Roi Sasson, Visit to the University of Haifa (Haifa Center for Marine Policy and Strategy Studies) – Summary of the Navy Commander, March 8, 2018.

population of naval officers in middle-rank positions (after command of a vessel) has been designated as one of the target audiences of the program.

Unfortunately, after three years in which the program has been in place and despite the abovementioned, the Navy has not yet formulated its position on the vitality of the program for the training of its officers, and especially for the training of the core officers in the Naval Officers track. A large part of naval officers who go studying choose an academic institution close to their place of residence, or with a non-demanding master's degree. Only one officer who joined the program chose the research track. Even senior officers sent to study at the National Security College (sponsored by the University of Haifa) do not study for a research degree. The Command and Staff Alon Program for naval arm trainees does not include maritime subjects, officers who go to study at military institutions abroad (Naval War College, Canadian Forces College), complete the school year without any academic credit. There is no doubt that the current situation produces less qualified officers, especially those who reach senior positions.

Our insight on this issue is that with the entry of a new Navy Commander into the post, it is appropriate to re-examine the training course of naval officers in military colleges and academic institutions, and in this context also establish a policy regarding those going for a master's degree academic studies in a security and naval strategy program.

Recommendations for an Israeli policy

This Maritime Strategic Evaluation is a policy-oriented document, as opposed to an academic document, and accordingly, we found it appropriate to summarize it in ten recommendations addressed mainly to the political echelon, the various government ministries and the Israel Navy. All recommendations are at the level of government policy in the domain of maritime policy. The order in which the recommendations are presented does not necessarily represent their importance, or the degree of urgency required to address them.

First recommendation – formulation of a grand maritime policy and strategy for Israel

As in previous years, there has been no progress on this issue in 2021. It has not even been mentioned in any of the 40 points of the basic guidelines for the formation of a unity government (the 36th Government of Israel) published in June 2021. Apart from the Eastern Mediterranean region where changes that require the formulation of a maritime strategy are taking place, the sea areas around Israel – both the Mediterranean and the Red Sea – are undergoing significant changes, which require redefining Israel's interests in the region, and including them in Israel's maritime policy and strategy.

Second recommendation – formulation of Israel's foreign policy in the eastern Mediterranean and the Red Sea

Israel's interests in the Eastern Mediterranean and the Red Sea, and what is the appropriate policy to realize these interests, must be defined. In the Red Sea, the issue is more urgent and related to the new and distant threats against Israeli shipping that have increased significantly following the expansion of Israel's campaign against Iran into the maritime domain. Recent events in the southern Red Sea and the entrance to the Persian Gulf, should be studied, because organizations that were operational by Iran and militias like the Iranian Revolutionary Guard used asymmetric and hybrid naval warfare tactics (including drone strikes), and an appropriate operational response should be formulated.

Israel must examine the benefits and pitfalls that this activity imposes on the freedom of navigation of merchant ships in any way related to Israel in the Red Sea, the Gulf of Aden, and the Persian Gulf (tankers carrying oil from the UAE to the EAPC). The Navy is required to test its capabilities to secure such a cruise, or alternatively get help

of the U.S. Fifth Fleet and other forces operating in the area by virtue of Security Council resolutions (CMF 150/151).

In the Mediterranean, previous annual reports noted tensions between Turkey and other countries in the eastern Mediterranean, including Israel. Following signals and messages conveyed by the Turkish authorities to Israel about their aspiration to improve relations between the two countries, we recommend exploring the possibility of improving relations with Turkey, supporting a political settlement for its economic water problem, and exploring the possibility of integrating it into the Middle East gas forum.

Third recommendation – the preparation and preparedness of the State of Israel for civil emergency events at sea

The coastal pollution event in the winter of 2021 revealed the lack of readiness of the State of Israel to deal with a civil emergency event in the maritime domain that includes the stages of discovery, inclusion, mitigation of the damage and handling of consequences). In Israel, there is no Coast Guard that in other countries is responsible, among other things, for dealing with civilian emergencies at sea. Therefore, one body should be defined as responsible for managing a civil emergency event in Israel's maritime domain, including continuously monitoring the situation in Israel's maritime domain. At the operational level, Israel has two government ministries capable of conducting civilian emergencies at sea: the Ministry of Defense (through the IDF and the Navy) and the Ministry of Internal Security (through the Israel Police). The Navy was budgeted for vessels and other capabilities that could allow it to monitor the maritime situation (even if this is done to protect the EEZ). In approving the memorandum of the draft bill on oil spill preparedness, in addition to the means and capabilities that will be handed to the Ministry of Environmental Protection, it must be determined that the Navy, in cooperation with other bodies, will be the body responsible for monitoring the overall maritime situation. It will also be important to determine by law who would be responsible for conducting a civil emergency event in Israel's maritime domain. In the absence of a Coast Guard in Israel, it seems that the responsibility for the issue should be placed on the Navy, or alternatively, establish a Coast Guard that will be subordinate to the Israel Police.

Fourth recommendation – preparation for climate change effects on Israel's maritime domain

It is proper to identify in advance threatening climate change scenarios and prepare for them.

The Ministry of Environmental Protection established the inter-ministerial directorate by virtue of a government decision from July 2018 and its designation is presenting to the decision-makers all the currently available information on the subject and act to implement for the security of comprehensive national preparations. When examining the Directorate's Report No. 1 on geo-strategy and economics, it seems that the committee addressed within the maritime domain only to coastal infrastructure.

The plan presented by the directorate is partial and limited in scope, and does not address the impact of climate change on Israel's maritime domain as a whole. It is imperative to deepen the understanding of the links between climate change effects and threats to maritime security, and it is necessary to conduct research on the interplay between climate change and maritime security and convert the research findings into policy documents.

Fifth recommendation – development and utilization of energy resources located in the sea and protection of the environment

Following the report written by the UN Intergovernmental Panel on Climate Change (IPCC) and the need to reduce greenhouse gas emissions, the question arose again as to whether Israel should continue developing the gas reserves in its economic waters.

In light of the conclusions of the team headed by the Director General of the Ministry of Energy, which examined the need for additional natural gas reservoirs in the next decade, and the energy market forecast by 2045, in our opinion, there is room to continue gas exploration in Israel's maritime domain, to maximize the profits from the production of this resource, and to channel them to the Wealth Fund in its original purpose.

Given the expected market conditions in Europe and the world in the coming years, the government and gas companies in Israel must concentrate their best efforts on developing the local and regional gas economy over seeking distant markets for export. The signing of the gas export to Egypt with the Tamar and Leviathan gas partnerships is definitely the right step in this direction. In our opinion, the gas pipeline project between Israel, Cyprus and Greece to Europe (Med East) is an ambitious project from an engineering point of view, and is not expected to be economically viable. The unilateral development of Cyprus in the 'Yishai-Aphrodite' joint reservoir, which is a cross-border natural gas reservoir between Israel and

Cyprus, requires the Israeli government to reach agreements with Cyprus as soon as possible regarding gas production from this reservoir.

It is appropriate to formulate an environmental policy, including readiness for dangerous events.

Sixth recommendation – promotion and organization of good order at sea

Israel should define its borders and governance at sea, and show that the maritime domain is not open for everyone and that it is a littoral country endowed with "maritime awareness" rather than "maritime blindness". The approval of the Marine Areas Law, 2017 in the Knesset must be completed. Non-promotion of the law might expose the state to claims in legal proceedings that will be required for the development of gas fields outside its territorial waters. In addition, it is necessary to correct the Planning and Building Law, 1965, which in its current form does not correspond to the nature of the activity in the deep sea.

Negotiations with Lebanon must be continued through American mediation on the demarcation of Israel's maritime border with Lebanon.

The reasons for and against Israel's accession to UNCLOS are not conclusive, and therefore we must continue to engage in the subject while creating a dialogue and thinking about the various issues – opportunities and risks – between academia, researchers and government. By this, it will be possible to identify the correct time for accession to UNCLOS and allow Israel to promote this move at the appropriate time.

Seventh recommendation – development of a human infrastructure for Israel's coping with the challenges in the maritime domain

The public resources required for investing in education and higher education systems must be determined in order to build an economic, social and human-professional infrastructure that can meet the challenges and opportunities inherent in Israel's maritime domain related to energy production and development, ecosystem protection, including industries that are needed for addressing these issues as well as the establishment of a 'Marine Association of Israel' that will serve as a platform for stakeholders discussions on the subject.

It is necessary to allocate a proper budget to the Mediterranean Sea Research Center of Israel, to ensure cooperation among all stakeholders on the subject, and

upgrade the status of the School of Marine Sciences at the University of Haifa to an independent school.

In view of the existing manpower crisis in the Israeli merchant navy and the apparent shortage of naval officers in the world, the number of Israeli cadets and officers at the Naval Officers' Training Institute in Acre must be increased, expand their curriculum and ensure that upon graduation they will be hired by shipping companies relating to Israel.

With the change of command of the naval arm, the arm must formulate its position regarding the academic training program of the middle-rank seafaring population going out to study and especially regarding their joining the Security and Naval Strategy program.

Eighth recommendation – the sector of shipping and ports in Israel

Following the beginning of operation of the Haifa Bayport and the South Port in the port of Ashdod in the coming year, it appears that Israel has succeeded in streamlining the port work in the domain of container ships. Efforts should be directed to streamline port activity in the areas of general cargo ships and bulk carriers (ships carrying bulk cargo, such as grain, coal and metal ores). In this context, the privatization of the port of Haifa (and later Ashdod) should be completed, thus increasing the efficiency of the ports in all types of cargo, including the handling of general cargo and bulk carriers.

Following changes in the shipping industry in the world and in Israel, and Israel's failure to maintain the 'gold share' within ZIM, or other incentive mechanisms for Israeli shipping such as the occupancy tax, a comprehensive and re-examination of Israel's policy in the shipping domain must be conducted, and establish a new policy on the subject at the end.

The international conference on cyber threats in the maritime domain held at the Israeli Cyber Week is the right step in enhancing awareness of threats in this domain and encouraging international cooperation, but it requires complementary steps of publishing policies for the Israeli ports and shipping sector and monitoring their defense plans against cyber threats.

Ninth recommendation – the State of Israel as a "startup nation" in the maritime domain

In September 2020, the inter-ministerial committee dealing with the maritime domain and the development of the 'blue economy', headed by the Director General of the Planning Directorate, approved a plan for developing a marine technology business community in Haifa. The committee's decision stipulates that the Haifa Municipality, together with the School of Marine Sciences at the University of Haifa and other stakeholders, led by the Planning Directorate, will develop a multi-year strategic plan to establish a National Marine Innovation Center including a physical, entrepreneurial, economic, structural and international action plan. The National Innovation Center will be established according to the plan in the Innovation District near the port, and will be a center of activity, which also includes marine activities with academic, economic, engineering and security cooperation.

The move of the inter-ministerial committee dealing with maritime domain is in the right direction, but should also be accompanied by additional steps from other government bodies like the chief scientist of the Ministry of Science and the Innovation Authority dealing with research and development at the national level.

Tenth recommendation – moving infrastructure from land to sea

Israel is one of the most densely populated countries in the world and this trend is getting worse over the years. In June 2012, the Israeli government decided to set up a special team to examine the feasibility of building artificial islands, on which infrastructure such as gas production facilities, power plants, airport desalination facilities, an airport, and military facilities would be built. Action must be taken to implement this decision.

In the plan to expand Israel's ports towards 2048, which will mark Israel's centennial, it is important that the plan be formulated in cooperation with the relevant authorities to prevent a situation in which conflicts arise between the port infrastructure and the municipal infrastructure (see the case of 'Haifa Bayport' blocking the possibility of expanding Haifa's airport).

A government resolution from October 2020, which requires that within a decade all preparations of the government bodies be completed so that the activity of the petrochemical industry in Haifa Bay is terminated, is an opportunity to determine which of these infrastructures will be located on artificial islands in the sea and prepare accordingly.

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Shaul Chorev (Chief Editor of the Maritime Strategic Evaluation for Israel – 2021/22; Chapters: Global Developments in the Maritime Domain; A Model for an Israeli Academic Marine Monitoring System; Conclusion of Maritime Strategic Evaluation for Israel 2021/22 and Recommendations for Israeli Policy) Professor Shaul Chorev, Rear Admiral (Ret.) is the former Head of the Israel Atomic Energy Commission. He has held many important positions in the Israeli security forces including Assistant to the Minister of Defense for Nuclear, Biological and Chemical Defense; Deputy Chief of Naval Operations; Commanding Officer of the Haifa Naval Base and Commanding Officer of an Israeli Naval Flotilla. Chorev holds a BA in Economics and Political Sciences from Bar Ilan University, MSc. from the United States Naval Postgraduate School and Ph.D. from Bar Ilan University.

Omri Eilat (Chapter: Israel–Turkey Relations – An Ocean of Opportunities) Dr. Omri Eilat is a social and economic historian of Modern Turkey and the Ottoman Empire. Recently, he completed his doctoral studies at Tel-Aviv University under the supervision of Prof. Ehud R. Toledano. Currently he teaches and researches at the Maritime Strategy and Policy Center and the Department of Middle Eastern and Islamic Studies at the University of Haifa.

Arie Gavish (Chapter: Reform in the Ports of Israel – Vision and Reality) Capt. (Ret.) Arie Gavish (Gambash) has 26 years of experience in commanding and staff positions in the Israeli Navy (retired as a Navy Captain), including commanding on various Israeli Navy vessel types, senior managing roles of large organizations, business planning and strategy building, broad Navy Headquarter roles, internal and external partners' management. 20 years of experience managing and leading two major ports in Israel: Ashdod Port and Haifa Port (before and after the ports' reform 2005, respectively), which are a national strategic asset, and serve as a critical axis in Israel's economic structure. Managing Ashdod Port along the construction of the “Eitan Port", and while maintaining full operation of the existing port, included business and strategic management, working side by side with Israel's Ports Authority, building partnership programs, leading complicated negotiations with labor unions, process improvement and implementing systematic working routines. Managing Haifa Port on behalf of the Israeli Port Authority, included focusing on deep expertise in the ports' regulation field, building and positioning a new port operation method called “Land Lord", constructing strategies of port security and safety, loading and unloading processes, and implementing these in the operational day-to-day.

Alexander Gerson (Chapter: Hazards of Transport of Dangerous Goods in Ships) Captain Alexander Gerson – Head of the Naftali Wydra Research Centre for Shipping and Ports. Graduate of the Maritime College in Akko; combat military service in

the Israeli Navy as commander of patrol boat in the Gulf of Suez. “Master Mariner Unlimited" as of 1979. Sailed and commanded ships of all types on worldwide routes for 30 years until 2021, of which 22 years as ship's Captain on all types and sizes of vessels world-wide. Academic studies in Physics and Industrial Engineering. MSc. Southampton-Solent UK International Maritime Studies, Shipping, Ports and Environment (2005). 1998–2016, Israeli Administration of Shipping and Ports, Ministry of Transport. The last 6 years in the capacity of Director of Shipping and Ports Inspectorate (Deputy Director General). Representative for the State of Israel at the International Maritime Organization (IMO) in London, taking active parts in many professional/legal debates and promoting the national interests of Israel. Israeli Liaison person to the European Maritime Agency (EMSA) and the Centre of Contingency and Response to Oil Pollution in the Mediterranean Sea (REMPEC and Italian Coast Guard). Lecturer on Dangerous Goods and Prevention of Ship-sourced pollution in national and international fora, as well as the Israeli Maritime Community. Lecturer at Israeli Maritime Education Authority – Senior Officers.

Ehud Gonen (Chapter: The Incident of the Suez Canal Blockage by the *Ever Given* Container Ship – The Implications for the Region and for Israel) Ph.D. Candidate at the University of Haifa. Held the position of Senior Fellow Researcher at the Harold Hartog School of Government & Policy, Tel Aviv University (2015–2016). He received an MA in International Relationship from the Hebrew University and a BA in Economics and Psychology from the University of Haifa. Gonen also served as a Diplomat (Trade Commissioner) to Singapore (2000–2004) and to Australia (2008–2012) as well as the chief economist of the foreign trade administration (2012–2016).

Merav Gonen (Chapter: Black Carbon Emissions from Ships in Israeli Ports) MA in Business Management from the Hebrew University and a BA in Business Management from the College of Management. Completed studies for a second MA in Natural Resources and Environmental Management at the University of Haifa. Graduate of the cadet course of the Ministry of Economy and employed at the foreign trade administration, Ministry of Economy (1997–2012). Employed at the Administration of Shipping & Ports.

Shlomo Guetta (Chapters: The Development of the Iranian Naval Branch in Recent Years and the Implications for Israel and the Middle Eastern Countries; Exclusive Economic Zones (EEZ) in the Red Sea Region: Risks and Opportunities) Capt. (Navy) (Ret.) Shlomo Gueta was born in October 1952. From 1971 to 1993, he served in various roles within the Israeli Navy intelligence command. Rising through the ranks to Captain (navy) in 1990, his last active role was the position of naval intelligence head of research. During his military service, Shlomo completed a bachelor's degree

with honors at Tel Aviv University, majoring in extended studies of the history of the Middle East, along with a minor in general history and statistics. In parallel, he graduated the National Senior-Level Intelligence Course. Upon retiring from active duty in 1993, Shlomo participated in executive management business administration course ("T.L.M.") at Tel Aviv University graduate school of business. From 1994–2019, he continued to serve as a senior naval officer (res.) and was charged with composing and analyzing intelligence research projects on various subjects. Already as civilian, Shlomo's experience in management heightened between 1993 and 2014 during which he held several senior management roles at the Raanana Municipality: starting with the position of head of the environmental department, head of the administrative steering committee (which led to the establishment of a residential neighborhood), head of the engineering and infrastructure department, VP for strategic planning and finally chairman of the city of Raanana water corporation.

Ofir Kafri (Chapters: Government Subsidies for the Maritime Sector Around the World: Commercial Shipping, Efficiency and Improved Productivity, Shipyards, Air Pollution, Research and Development, etc.; Financial and Other Benefits Through Using Flag of Convenience in the World: Panama, Marshal Islands, Malta, Cyprus and The Bahamas) Ofir Kafri studied international security at Sciences Po in Paris, Law and International Relations at University of Haifa and at New York University School of Professional Studies. He Received the Erasmus Mundus Scholarship, cyber security research scholarship and other scholarships for excellence. He attended seminars at NATO, OECD and other international organizations. He was general secretary of the Israeli Association for International Studies (IAIS) and Editor-in-Chief of Student Journal in the Faculty of Law. Participated in the National Security Studies Center in the Fields of International Financial Regulation, Cyber security and intelligence. Conducts research in the field of international taxation and subsidies, investments and the international financial system.

Tzevy Mirkin (Chapter: Russia and the Indian Ocean) Tzevy Mirkin is a historian, specialising in the history of the Russian Navy and Russian Naval Strategy. In 2014 taught a course on the history of the Russian foreign policy at the Faculty of Government of the IDC in Herzliya. In the past served as an analyst at the Center for Political Research of the Israeli Foreign Ministry and as a diplomat at the Israeli embassies in Russia and in Latvia. He is Ph.D. Candidate at the Department of Maritime Civilizations, University of Haifa, and Research Fellow at Chaykin Chair for Geo-Strategy.

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Elai Rettig (Chapter: Solar Hopes and Grounded Reality: Should and Could Israel Meet its 2030 Renewable Energy Transition Targets) Dr. Elai Rettig is an Assistant Professor in the Department of Political Studies at Bar-Ilan University. His research focuses on patterns of international conflict and cooperation over energy resources. He was previously an “Israel Institute Teaching Fellow" in the Environmental Studies Program at Washington University in St Louis, and a lecturer in the Jones Graduate School of Business at Rice University in Houston. He won scholarships from the Israeli Ministry of Energy, the Israeli Ministry of Science, and the Chaikin Chair in Geostrategy, and he has published on energy security issues in peer-reviewed journals such as International Studies Quarterly, Foreign Policy Analysis, and the International Journal of Press/Politics.

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Glen Segell (Chapter: The Chevron Corporation and the State of Israel) Professor Glen Segell (DPhil, FRGS) is Visiting Professor and Research Fellow in the Department of Political Studies and Governance at the University of the Free State, South Africa, and Visiting Professor in the Department of Political Science, Niger Delta University, Nigeria. He is also Research Fellow at the Ezri Center for Iran & Gulf Studies, University of Haifa, Israel, and Associate of the Think Tank for the Research of Islam, and Muslims in Africa (RIMA). He is Editor of *The Middle East Tracker* and *The London Security Policy Study.* He is a Member of the Editorial Advisory Boards of the *Journal of European and American Intelligence Studies* and of *Cyber, Intelligence and Security* (INSS). He serves as an Executive Advisory Board Member of the International Political Studies Association Research Committee on Armed Forces and Society. He was educated to a BA and MA at the Hebrew University Jerusalem and to a PhD at the University of Oxford. He is a Fellow of the Royal Geographical Society. His interests are history and politics especially extremist politics. He has held teaching / research positions in the United Kingdom, Israel, and South Africa. He holds the rank of Brigadier-General (Reserves) and is an expert for NATO STO. His publication record can be viewed at ORCID 0000-0002-4186-2761

Itai Sela (Chapter: Estimate of the Cost of Protecting the Sea Ports in Israel Against Cyber Threats) Commander (Ret.) Itai Sela is Founder and CEO at Naval Dome cyber defense solutions for maritime platforms. Itai served as a Naval Commander and has 25 years of experience in the Israeli Navy and Prime Minister's Office holding numerous field and HQ commanding positions. Itai holds a BA in Social Sciences from Bar Ilan University and an MBA from Ben Gurion University.

Orin Shefler (Chapter: UNCLOS, Delimitation of Maritime Boundaries and Offshore Infrastructure as a Means for Regional Cooperation and Reconstruction of the Gaza Strip) Advocate Orin Shefler is a corporate and commercial attorney, and has been active in the energy and high-tech industries for over sixteen years. As part of his expertise, Orin has worked on offshore oil & gas projects in Israel, and has focused on the development of offshore infrastructure. Orin writes, researches and lectures periodically as part of the M.A Program on National Security and Maritime Strategy offered by the School of Political Sciences at the University of Haifa, in collaboration with the Maritime Policy & Strategy Research Center (HMS). During his career, Orin has acted as in-house counsel for an offshore oil & gas consulting firm, and as a tech-

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The Maritime Policy & Strategy Research Center is engaged in research on maritime strategy as part of the University of Haifa's effort to lead the Israeli national research in the maritime domain. The Center conducts academic research in the areas of regional security and foreign policy, the movement of goods, people and ideas, law, energy, and the environment – all while examining their impact on the national security of the State of Israel.

The Maritime Strategic Evaluation for Israel, 2021/22 reviews the main changes in the maritime domain in 2021 and discusses global strategic issues, maritime issues in the Middle East, economic aspects, hazards in the maritime domain, and maritime law and good order at sea. In addition, it includes recommendations for policy and course of action for decision-makers in the grand maritime domain, which would strengthen Israel's resilience and security, improve its economic standing and its citizens' wellbeing - all while preserving the ecosystem of the maritime domain and the heritage assets in it.

The report was written by researcher fellows of the Maritime Policy & Strategy Research Center at the University of Haifa, and other researches who have a unique knowledge of these subjects.

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