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מרכז חיפה למחקרי מדיניות ואסטרטגיה ימית
Haifa Research Center for Maritime Policy & Strategy

MARITIME STRATEGIC EVALUATION FOR ISRAEL 2016

Chief editor: **Prof. Shaul Chorev**
Edited and produced by: **Ehud Gonen**

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April 2017

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The Maritime Strategy Evaluation report, including the insights and recommendations included in it, 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 Haifa University.

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Haifa Research Center for Maritime Policy and Strategy

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.

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.

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Executive Summary

In early 2016, the Board of Governors of the University of Haifa approved the establishment of the Haifa Research Center for Maritime Policy and Strategy,[1] with the goal that it would carry out research on issues of regional security and foreign policy, the flow of goods, people, and ideas, law, energy and the environment, from the perspective of their effect on Israel's national security.

The Center has set itself the objective of carrying out academic research as part of Haifa University's desire to play a leading role in national maritime research, alongside the effort to serve as a **center of knowledge for policy makers, public figures and the citizens of Israel** and to become part of the public discourse. This includes the publication of position papers, the hosting of symposiums and presence in the media. In addition, the Center has begun the process of creating research collaborations with leading research centers abroad and of training young researchers in a variety of fields related to maritime strategy.

The importance of the maritime domain as a component in Israel's security has not yet been fully recognized by the leaders of the State or by public opinion in Israel. This phenomenon is not unique to Israel and even countries with a clear maritime tradition, such as the US, feel that before formulating a maritime strategy, it is first necessary to achieve Maritime Domain Awareness.[2] In the case of Israel, the most important factors that the government and the public should be aware of are the following: the unique geostrategic position of Israel, the high proportion of the population living near the Mediterranean coast, the discovery of offshore natural gas reservoirs, the complete dependence of Israel on maritime trade (both for exports and imports) and the ocean as the only location for new infrastructures and as the destination for dangerous infrastructures to be removed from population centers. These characteristics essentially make Israel an "island surrounded by dry land" that is totally dependent on the sea. Nonetheless, the

1 Maritime strategy as opposed to naval strategy includes, in addition to the sea itself, all of the issues related to this domain as well as whoever sails in it or lives near it. It includes, among other things, diplomatic aspects; defense and safety of commercial ocean shipping; fishing; use, preservation, regulation and defense of exclusive economic waters; coastal defense; border security; protection of islands; and also participation in regional and international organizations.

2 Maritime Domain Awareness (MDA): "The effective understanding of anything associated with the maritime domain, all areas and things of, on, under, relating to, adjacent to, or bordering on a sea, ocean, or other navigable waterway. MDA encompasses all maritime related activities, infrastructure, people, cargo, and vessels and other conveyances that could impact the security, safety, economy, or environment of the country".

lack of awareness of these issues has for the most part led to a reactive policy, as occurred in the case of the discovery of natural gas within Israel's territorial waters and the geopolitical significance of developing Israeli ports. If there had been sufficient awareness of these issues and an in-depth process of policy formulation, then Israel's interests in this domain would have been clearly defined ahead of time. These interests would have then been translated into a maritime strategy, as has occurred in many coastal nations during the last decade.

One of the Center's goals is to **publish an Annual Maritime Strategy Evaluation** that focuses on the region of the Eastern Mediterranean and the Red Sea, but also includes an examination of global trends and developments in the maritime domain, which are likely to have an influence on the Eastern Mediterranean in general and on Israel in particular. The previous report was published in December 2015 and was praised for its high level of analysis and its broad scope.[3] Essentially, this report lays the foundation for the annual evaluation which relates primarily to changes that have occurred and trends that have appeared and provides recommendations to decision makers, primarily those within the government of Israel.

From the viewpoint of methodology, it would have been correct to carry out this evaluation relative to existing maritime strategy and policy, but in their absence the Haifa Research Center for Maritime Policy and Strategy has decided to formulate a number of assumptions with respect to Israel's national goals and policies, and these will serve as the basis for writing an annual evaluation on the subject. Therefore, on those subjects where there is no policy or in cases where we are not informed of such as policy (such as, for example, shipping and cyber warfare), we have made recommendations as to which areas require policy formulation or revision.

Participating in **the writing of this report** were researchers of the Haifa Research Center for Maritime Policy and Strategy, its research fellows and other individuals at the University who have expertise in this field.

During the course of 2016, **Haifa University in collaboration with the Hudson Institute** in Washington established a committee of American and Israeli experts with reputations in the fields of security and energy as part of the establishment of

3 Dr. Ehud Eran and Dr. Aviad Rubin, "Evaluation of Israel's Maritime Strategy: Annual Report 2015", Haifa Research Center for Maritime Policy and Strategy, 2015.

a joint consortium for carrying out research on the Eastern Mediterranean.[4] The committee met in full plenum on two occasions in order to review and discuss the latest developments in these areas and in August 2016 it published a comprehensive report. In view of the reputations of the committee members in the areas of security and energy, we saw fit to include some of their insights and recommendations in this document.[5] The full report can be found on the site of the Haifa Research Center for Maritime Policy and Strategy and can be perused separately.[6]

The Maritime Evaluation for Israel opens with the chapter "**Transformation, Change and Trends in the International Maritime Domain**". Two main factors affect these trends: **globalization and the Exclusive Economic Zone**. The ongoing process of globalization, which is reflected in the increased flow of goods, information and people from one nation to another and the integration of economies, has led to increasing international interest in the strategic and security aspects of the maritime domain. The expansion of the Exclusive Economic Zone, along with the technological development that is facilitating the discovery and exploitation of offshore resources, has led a number of countries to redefine their interests in the maritime domain, including the adoption of a new maritime strategy. This is reflected in, among other things, the growing power of China, which is seeking to expand its Exclusive Economic Zone in the South China Sea and is posing a challenge to other nations in the region. China is expanding its overall presence in the maritime domain, leading to an American response to what they view as a threat. The renewed race for control of the Arctic Ocean and the objectives that Russia has set for itself in this region are also a reflection of this trend.

The report then looks at the **Transformation and Changes** that occurred in 2016 in the area of the Eastern Mediterranean and the Red Sea, while examining the implications of what is happening in the Indian Ocean and the Persian Gulf, and considers the threat of maritime terror against Israel. The political instability in the Arab world (Syria, Libya, Lebanon, Yemen and Iraq), alongside the nuclear agreement signed between Iran and the superpowers in July 2015, continued to drive the major events in the Eastern Mediterranean and the Red Sea and they

4 Commission members: Co–Chair Prof. Shaul Chorev, Co–Chair Senator Mary Landrieu, Admiral (ret.) Ami Ayalon, Dr. Seth Cropsey, Charles Davidson, Douglas J. Feith, Dr. Arthur Herman, Ambassador Ron Prosor, Admiral (ret.) Gary Roughead and Prof. Eytan Sheshinski.

5 Report of the Commission on the Eastern Mediterranean Sponsored by University of Haifa and Hudson Institute, August 2016.

6 At the website of Haifa Research Center for Maritime Policy and Strategy: http://poli.haifa.ac.il/~hms/images/publications/HaifaHudsonReport.pdf

are described in this chapter of the report. It is worth emphasizing the impressive increase in the presence of Russia's Black Sea fleet in the Eastern Mediterranean, in contrast to the reduced presence of the US Sixth Fleet. There are a number of researchers who claim that the objective of the Russian strategy is to one day transform the Eastern Mediterranean into an area that is inaccessible to the US Navy and its allies (known as a policy of Anti-Access/Area-Denial). If indeed they are successful, this is likely to limit the access of the US and its allies to the Suez Canal, the Black Sea and the resource-rich Eastern Mediterranean, which will be subject to the hegemony of an increasingly aggressive Russian regime.[7]

The report then examines various aspect of the **discovery of offshore natural gas fields** and the opportunities they provide to Israel with respect to energy independence and perhaps even the possibility of it becoming a significant exporter of gas to its neighbors in the Eastern basin of the Mediterranean, or even to countries in Europe. It is predicted that in the coming decade the production of gas will produce profits of over $270 billion for Israel, half of which will accrue to the public by way of taxes and royalties.[8] The natural gas resources will strengthen the Israeli economy, ensure its energy independence, reinforce its diplomatic position and present new challenges to its army. Unfortunately, as a result of the drawn-out regulatory process and the major drop in global energy prices, Israel lost out on profits it would have received from the natural gas fields had they been developed in a timely manner. Another negative outcome of this long process is the message to future investors who might be interested in developing these resources.

The discovery of natural gas in Israel's economic waters at the beginning of the decade and the start of production has focused attention on the need **to protect vital infrastructures**, in particular against terrorist attacks and precision missiles. Although the navy and other bodies have allocated resources to build up the necessary defense capabilities, from a systemic point of view it does not appear that this issue has been thoroughly examined. The report also looks at the situation of the various infrastructures for reception of the natural gas and their location, as well as their survivability and redundancy in the case of a terrorist attack or sabotage.

A new subject that is being included in the report for the first time is **cyber warfare in the maritime domain**. The dramatic developments in recent years in

7 Matthew Bodner, "Russia's Black Sea Fleet Will Get 80 New Warships to Repel NATO," Moscow Times, 23 September 2014.

8 Hudson Institute and the University of Haifa, Report of the Commission on the Eastern Mediterranean, August 2016, P. 25.

communication and information technologies have affected the way in which state and non-state players operate in the maritime domain. These technologies have created opportunities but also challenges for the involved parties, on the military and commercial levels, as well as in the area of law enforcement. The navy, like the rest of the defense establishment, became involved in this area at a relatively early stage and the maritime aspect of cyber warfare is receiving the warranted attention. Nonetheless, the report indicates that this same level of priority is not being given to the civilian maritime domain (shipping, ports and maritime infrastructures) and recommends a series of steps that should be taken.

In the area of **shipping and ports**, the report looks at the situation of the sea ports that serve as a critical link in the logistic chain of international trade, which Israel is a part of, given the fact that an absolute majority of Israel's trade is by sea. The report describes the priority given to developing the ports in recent years. With regard to the situation of Israeli-owned ships or ships controlled by Israeli companies, the report describes a decline in recent years, both in the number of Israeli ships and in the number of Israeli seamen. This process is accompanied by the closing of training programs for the commercial fleet in the maritime schools, which may lead to a shortage of manpower during the coming decade in professions such as maritime pilot. The report also relates to the preparedness of the ports to deal with security events, such as the Second Lebanese War.

The report looks at the recent developments in Israel's maritime borders as they relate to the Delimitation Agreement of the EEZ with its neighbors. Israeli did not sign the United Nations Convention of the Law of the Sea, which specified that an Exclusive Economic Zone of 200 nautical miles from shore will be defined for each country and in which it will have exclusive rights to offshore resources. Nonetheless, a government decision in 2011 set the northern maritime delimitation line of its costal waters and Israel's EEZ in the Mediterranean. Israel came to an agreement regarding the boundary of its economic waters with Cyprus, but there is still a lack of agreement with Lebanon on this issue. Another issue that may have security implications for Israel, though it is not a directly involved party, is the agreement between Egypt and Saudi Arabia regarding the **restoration of sovereignty over the Tiran and Sanafir Islands** at the southern end of the Gulf of Aqaba, near Saudi Arabia. The agreement itself has raised a storm of protest in Egypt where many view it as violation of Egyptian sovereignty and as a concession of Egyptian territory. Furthermore, the Constitutional Court has ruled that the decision is unconstitutional.

In recent years, **many countries have changed or modified their maritime strategies** in view of the changes occurring in this domain. Each of them adopted a methodology that is appropriate to its needs. For example, in countries where the security aspect is not a dominant factor (such as, for example, Portugal), they have chosen a particular methodology while in countries like India a different methodology was chosen. The Haifa Research Center for Maritime Policy and Strategy has considered the various strategies and will in the near future suggest an appropriate methodology for Israel to use in formulating its maritime strategy. The principles of this methodology are presented in this report and on the completion of this research it is the intention to distribute the document for use by those who are responsible for this domain.

Despite the lack of approved maritime policy and strategy objectives for Israel, **there has been progress in the area of maritime spatial planning**. This work is intended to resolve the increasingly serious problem of lack of coordination in the building of infrastructure and the implementation of maritime activities, which sometimes prevent the establishment of other infrastructures in the future. While there is comprehensive planning of Israel's dry land territory by means of a series of masterplans from the local up to the national level, there is still no similar framework for the sea. A Maritime Plan for Israel is a result of the initiative of a group of researchers and planners at the Center for Urban and Regional Studies in the Faculty of Architecture and Town Planning at the Technion, who worked together with consultants from Israel and abroad and large group of interested parties who made a major contribution to the preparation of the plan and its derivatives. The plan was completed in November of 2015 after two years of in-depth and intensive work. A researcher from the Haifa Research Center for Maritime Policy and Strategy took part in the work and describes the developments in this area in this report.

The report also surveys the progress in the **construction of onshore gas infrastructure,** as well as additional offshore infrastructures. In 2011, the Ministry of Energy initiated a plan for the construction of a reception facility for Liquefied Natural Gas (LNG) using the buoy system west of Hadera. In 2013, the Israel Electricity Company signed a contract to lease it and in addition a reception facility was established on the coast where the raw natural gas is processed into a usable product. A number of local authorities were opposed to the establishment of the facility within their boundaries and requested that the Supreme Court mandate offshore gas facilities.

Israel is one of the most crowded countries in the world and its population centers are expanding and merging into metropolises. The proximity of populated areas to dangerous/nuisance facilities has led to the establishment of infrastructure facilities on the urban peripheries and in rural areas, at the expense of agricultural land or green areas. **The construction of infrastructure facilities on an artificial island** can provide a buffer between the facilities and the population. In 2012, the government of Israel created an interministerial steering committee to carry out a feasibility study for the creation of artificial islands where the facilities would be located.[9] The chapter in the report on this issue reexamines the need for an artificial island and recommends a series of technological solutions, in addition to reviewing the progress so far.

Any offshore development requires an **environmental and ecosystem protection policy**. Israel must define for itself the appropriate way to institute energy development best practices. There are a number of aspects of Israel's preparedness in the area of environmental protection, including cooperation with neighboring countries. This chapter of the report examines the current situation and proposes ways to improve the handling of the issue. It should be mentioned that not all environmental parameters are under Israel's control. On the contrary, the expansion of areas under limited governance along the coast of the Eastern Mediterranean weakens the ability for environmental monitoring. In the current situation, the United Nations Environment Programme (UNEP) has even reported that pollution of the Mediterranean from onshore sources is growing every year.

The Annual Review of Maritime Policy and Strategy will attempt to create an infrastructure for evaluation according to a number of parameters which can be used in coming years to assess Israel's maritime situation.

The report includes policy recommendations and options for implementation for senior-level decision makers in the government and the bureaucracy. These were viewed as the most important recommendations by the various participants in the writing of this report and they can help Israel in correctly dealing with the challenges enumerated in this report. Following are those recommendations:

1. The formulation of a maritime strategy for Israel.
2. The protection of shipping which is essential to Israel both in emergency situations and on an ongoing basis.
3. Inclusion of the Mediterranean as part of Israel's strategic depth.

9 Government Decision 4476 on June 17, 2012 regarding an evaluation of the feasibility of establishing artificial islands for infrastructure facilities.

4. The development and exploitation of offshore energy resources while protecting the environment.
5. The development of professional manpower to deal with Israel's new maritime challenges.
6. Formulation of a diplomatic policy in the Eastern Mediterranean and the Red Sea.
7. Dealing with maritime terrorist threats.
8. Making progress in the area of maritime justice and law.
9. Exploiting opportunities created with the discovery of offshore natural gas in order to strengthen Israel's international and economic status.
10. Inclusion of the Haifa Research Center for Maritime Policy and Strategy in national research projects.

Chapter 1: Global Maritime Developments

Shaul Chorev

General

Although this report focuses on the **Eastern Mediterranean and the Red Sea**, one cannot analyze the developments in this region without relating to recent global events in the maritime domain, in view of the close connection between them and what is happening in close proximity to Israel.

The first development that is worthy of mention from a global perspective is **the gradual shift in the center of gravity** in the geopolitical, economic and geostrategic domains – **from the West in the direction of East and Far East Asia**. This is the result of the growing importance of this region in global economic development. In this context, it is worth mentioning that China is the most influential nation that is part of this trend, although India is not far behind. On the assumption that this trend indeed continues, then in coming decades this region will be making the largest contribution to global Gross Domestic Product (GDP).[1] Moreover, the region is expected to account for one half of the world's population in about 20 years from now. Therefore, any major development in the region is likely to have implications for security and defense throughout the world.

Aside from short-term economic cycles, it is expected that the **economies of the US, China and India** will become the leading members in the G-3. Each of these countries will have to deal with a spectrum of challenges in the future, in the areas of defense, climate and maintaining the rate of economic and industrial growth, among others.

The economic, social and political changes that the US is experiencing have led to the **decline of US global hegemony** and its status as the only superpower since the end of the Cold War. Its position has been weakened both politically and economically by the rise of China and India. The signs of US weakness as a global superpower led to the increasing influence of China in Africa and Asia, of Russia in Eastern Europe, the Caucasus and the Middle East and of India in Asia. The hesitancy of the US to act decisively has led to moral and propaganda victories for Iran, Syria and Russia, despite American military and technological superiority. It is still too early to assess the effect of Donald Trump's election and his declared intention of restoring America's former status.

1 UN Population Prospects, 2010.

Militarily, the **US** is expected to maintain its status **as a superpower** in coming decades, but **China and India**—which are arming themselves with advanced weapons systems that have diverse capabilities—are also expected to achieve recognition as **regional superpowers**. If China can maintain its current level of defense expenditure and its economy continues to grow, then within a decade its defense expenditures will be triple those of the US.

Although **Europe** will continue to be a significant economic power, and apparently also the **fourth largest economy** in the world, it does not appear that its international status will be sufficient for it to join the G3 superpowers, due to its lack of ability to project power. Europe will continue to maintain its position as a center for world trade, although China has ambitions to replace it, which is manifested in the "Maritime Silk Route Initiative".[2]

The Russian Federation is seeking to restore its status as a global and regional power despite its **political, economic, social and demographic problems**. The attainment of this status will be by means of an opportunistic policy and the application of military power. These aspirations make Russia into a complicated security challenge for Europe as a whole and as a result also for the US. The new Russian military doctrine approved by Putin in 2014 reflects the influence of the crisis with the Ukraine and the Russian response to the positions of the US and NATO in that conflict. In this situation, it is reasonable to assume that Russia will try to create alliances with several of the European countries when that aligns with its national interests. From time to time, Russia will try to drive a wedge between members of the EU with the goal of undermining European unity. Russia will continue to have an influence on the former Soviet states, by means of both "soft power" and "hard power".[3] Russia will continue with its intervention in Ukraine, the Caucasus and Central Asia and will oppose any attempt by NATO to expand its influence in the former Soviet states. Russia will seek to **control the Arctic region**, based on the understanding that it is essential to its economic and security future. Europe will remain the focus of Russian economic activity, with emphasis on the EU in the export of its energy resources. The drop in the prices of energy, which accounts for 80% of Russian exports, and the sanctions imposed by the West following the invasion of Crimea, have contributed to the economic crisis in Russia. Russia will

2 Selier Elodie, China's Mediterranean Odyssey, China has bought Greece's Piraeus port, but how realistic is Beijing's Mediterranean dream? **The Diplomat**, April 19, 2016 http://thediplomat.com/2016/04/chinas-mediterranean-odyssey.

3 Soft power: a strategy in international relations that makes use of economic or social influence on a rival nation in order to achieve goals, in contrast to hard power which involves, among other things, the use of military power to achieve goals.

continue to be **one of the largest arms exporters in the world** and will be prepared to offer weapons with state-of-the-art technology, some of which are even more advanced than those of the US.

Defense and security will continue to be essential issues both in the virtual and physical realms, including space and the cybernetic domain. The necessity to protect the citizens of the various countries will become even more important in view of the growing global population, climate change, the shortage of resources and the lack of stability in the international arena. These needs are expected to motivate governments to expand their defense program in order to provide for their physical needs. Many of these needs are international in nature and relate to the globalization phenomenon.[4]

Piracy and terror in the maritime domain are posing a major threat to trade and global shipping, and are having an effect on bilateral relations between nations (such as in the case of India and Pakistan). Currently, there is still a clear distinction that can be made between **maritime privacy** and **maritime terror** with respect to their strategies, methods of attack and the means they employ, in addition to the different regions in which piracy and maritime terror occur. Nonetheless, since there are **certain characteristics common to both**, such as their targets, the theft of cargo and the taking of hostages, connections between them may develop. In recent years, various countries have upgraded their ability to deal with the threat of piracy, particularly in the Indian Ocean. This is being accomplished by both international forces that were established specifically for this task and independent national forces (such as those of China and Russia). This activity has led to a sharp drop in reported incidents of piracy although the economic cost of this effort is significant (Figure 1.10 and 1.11).

Main trends in global maritime trade

More than 80% of global trade is by way of the sea and maritime shipping is the most important means of transporting goods. The three largest shipping companies (MSC of Switzerland; Maersk Line of Denmark and the CMA-CGM Group of France) account for about 30% of the container movement (TEU).[5]

4 The Development, Concepts and Doctrine Centre (DCDC) Global Strategic Trends, Programme analyses the future strategic context. Global Strategic Trends out to 2040, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/49954/20121129_dcdc_gst_regions_sasia.pdf

5 The Global Facilitation Partnership for Transportation and Trade (GFP), http://www.gfptt.org/node/2785

The decrease in maritime trade in 2009 as a result of the economic crisis came to an end with the global economic recovery. During the period 2010-13, trade returned to a path of growth and increased by 4.9% per year. This increase reflected the growing demand for imports in a number of key nations. The rate of growth in trade even exceeded that in GDP. Nonetheless, recent changes in demand trends have **slowed the rate of increase in maritime trade** from 3.2% in 2014 to only 2% in 2015. The increase in the construction of new container ships stood at 2.6%, as compared to an increase in demand of only 1.3%, which created excess supply and led to problems for the various shipbuilding companies. Figure 1.1 presents the increase in global trade and the breakdown according to type of cargo.

The drop in trade of goods and services in 2015, in financial terms to its lowest level in five years, is presented in the table below. The rate of decrease also includes the rate of depreciation in the value of the various currencies in 2015 relative to the US dollar.[6] Nonetheless, countries in the Far East and the Pacific countries are still increasing their maritime trade and they account for 85% of the increase.

Table 1.1 International trade for selected countries in billions of dollars

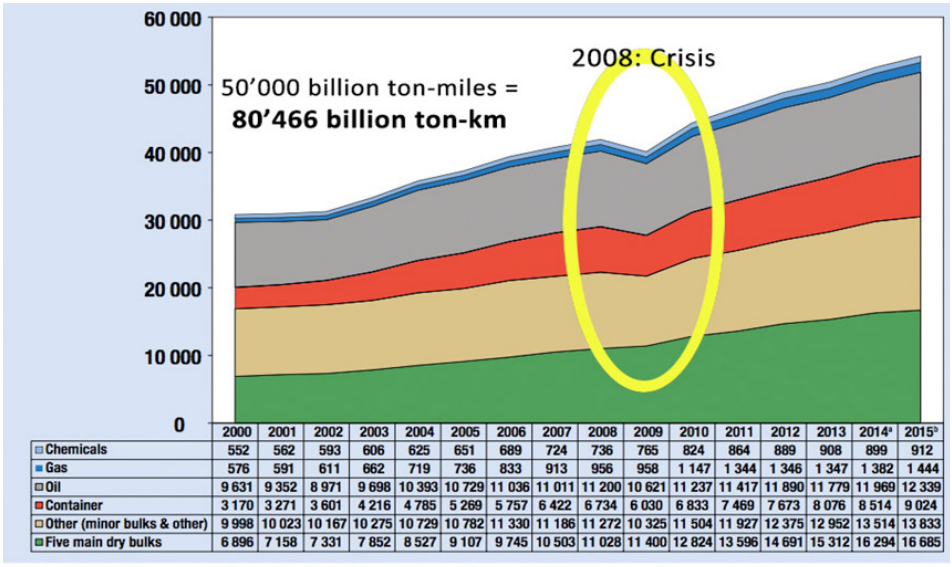
		Trade in goods				Services			
		2010	2014	2015	Increase in 2015	2010	2014	2015	Increase in 2015
Exports	Global	15,302	18,997	16,484	-13%	3,953	5,068	4,747	-6%
	Developing economies	7,439	8,478	7,345	-13%	1,125	1,472	1,435	-2%
	Transition economies	609	764	526	-31%	98	126	103	-18%
	Developed economies	8,255	9,755	8,614	-12%	2,730	3,470	3,208	-8%
	Non-developed economies	162	206	154	-25%	24	39	41	-4%
Imports	Global	15,421	19,007	16,671	-12%	3,847	4,954	4,678	-6%
	Developing economies	6,020	7,988	7,033	-12%	3,847	4,954	4,678	-6%
	Transition economies	453	553	384	-30%	122	184	140	-24%
	Developed economies	8,947	10,467	9,254	-12%	2,391	2,919	2,703	-7%
	Non-developed economies	169	266	242	-9%	60	25	83	-3%

Source: UNCTAD[7] and WTO.

The increase in global demand for ocean shipping in 2011 and 2016 and the main contributors to it (i.e. China and India) are presented in Figure 1.2. The value of annual global trade through the South China Sea is $5.3 trillion, of which $1.2 trillion

6 UNCTAD – United Nation Conference on Trade and Development, Statistics, http://unctad.org/en/Pages/statistics.aspx

7 Global trade slows down to a five-year low in 2015 http://unctad.org/en/pages/newsdetails.aspx?OriginalVersionID=1230



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014[a]	2015[b]
Chemicals	552	562	593	606	625	651	689	724	736	765	824	864	889	908	899	912
Gas	576	591	611	662	719	736	833	913	956	958	1 147	1 344	1 346	1 347	1 382	1 444
Oil	9 631	9 352	8 971	9 698	10 393	10 729	11 036	11 011	11 200	10 621	11 237	11 417	11 890	11 779	11 969	12 339
Container	3 170	3 271	3 601	4 216	4 785	5 269	5 757	6 422	6 734	6 030	6 833	7 469	7 673	8 076	8 514	9 024
Other (minor bulks & other)	9 998	10 023	10 167	10 275	10 729	10 782	11 330	11 186	11 272	10 325	11 504	11 927	12 375	12 952	13 514	13 833
Five main dry bulks	6 896	7 158	7 331	7 852	8 527	9 107	9 745	10 503	11 028	11 400	12 824	13 596	14 691	15 312	16 294	16 685

Source: UNCTAD secretariat, based on data from Clarksons Research (2015b).
[a] Estimated
[b] Forecast

Figure 1.1 Global maritime trade and its breakdown according to type of cargo

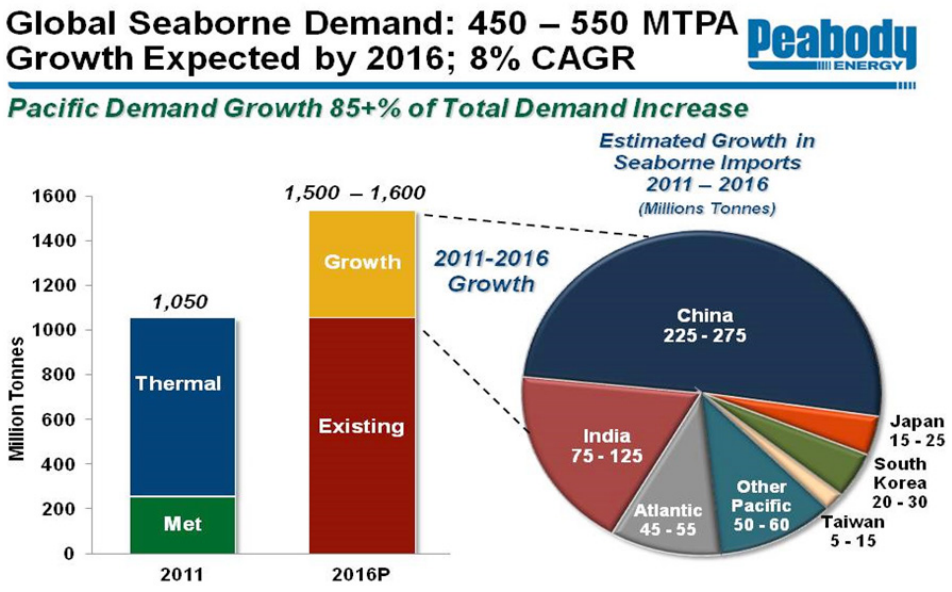


Figure 1.2 The global demand for ocean shipping by country/region (MTPA –Millions of Tons Per Annum)

is due to trade between China and the US. Eighty percent of the fuel imported by China travels through the choke points of the Malacca and Lombok Straits.

New Shipping Lanes

The addition of a 52-kilometer lane to the **Suez Canal** in order to make it two-directional was completed n August 2015. In addition, work was completed on the expanded **Panama Canal** in 2016. These projects included a third system of passage that allows longer ships, with a capacity of up to 13 thousand TEU, to pass through and will facilitate the growth in China's trade. As a result of the opening of the canal, the shipping of crude oil from Venezuela to China has been shortened from 45 sailing days to 30 and operating costs have been reduced. The desire to alleviate the existing choke points is also reflected in the ambitious plans to dig the Nicaragua Canal with Chinese financing, which will compete with the Panama Canal, as well as the agreement signed in 2016 between China and Thailand for a long-term project to build the Kra Canal, which is also known as the Thai Canal. The canal is meant to cut through the Kra Isthmus in Southern Thailand and to provide a new shipping route that will shorten sailing time from the East to Europe by about 1,200 kilometers, by detouring around the Malacca Straits.

There is an interesting development in this context taking place in the Northwest Passage of the Arctic Ocean, which until now was closed to commercial shipping due to the thick ice covering it all year round (Figure 1.3 below). It now appears that climate change in recent years has reduced the thickness of the ice. It is predicted that if this trend continues, then **it will be possible to use this route during most of the year** in about two decades. Sailing this route from Europe to East Asia will save about 2,500 miles. In addition, the shipping of oil from Alaska to the East Cost of the US by tanker will be much quicker.

It is believed that billions can be saved in shipping costs. At the same time, it will be necessary to resolve the current disagreement between Canada and other countries (including the US), whereby the Canadians view the route as within its territorial waters. It will also be necessary to deal with the challenges of protecting the environment in this unique region.

Exclusive Economic Zones – a contribution and issues of contention

Since the coining of the term Exclusive Economic Zone (EEZ) **in 1982** and the signing of the UN Convention on the Law of the Sea, **underwater technology has**

Figure 1.3 Possible routes of the Northwest Passage

progressed dramatically with respect to the discovery, development and extraction of offshore natural resources. Many countries have started the process of Marine Spatial Planning which is intended to resolve the conflicts between the various players active in this domain. Nonetheless, there still remain a large number of **international conflicts** with respect to the delimitation of EEZs, as well as fishing rights in these regions. Some of these disagreements will be resolved in the future through various types of agreements, but others will remain unresolved and will involve the danger of friction and regional conflict, which in some scenarios may even lead to armed conflict.

In the Eastern Mediterranean, there remain four issues of contention that remain unresolved:

1. **The claim of Northern Cyprus** (under Turkish rule) to part of the EEZ around Cyprus.
2. **The claim of Turkey** to part of Cyprus' EEZ and the disagreements with Greece that remain unresolved.

3. **The claim of Lebanon** that the agreement reached between Israel and Cyprus includes part of the territory that belongs to Lebanon (definition of the maritime border between Israel and Lebanon).
4. The claim by the Palestinian Authority with regard to the territorial waters along the coast of the Gaza strip and its claim that Israel has violated the maritime appendix of the Oslo Agreement.

The main naval fleets – trends and changes

This section surveys the changes and trends occurring in the major naval fleets, with focus on theaters of activity, **operational** strategy and the planned **buildup of strength** in each of the fleets.

The US Navy

The budget allocated by the US to its military forces is the largest in the world and accordingly the US fleet still remains the most powerful navy (the US Navy's budget in 2016 totaled about $167 billion). The US Navy is in the process of enlarging its fleet of warships and in 2016 it possessed 282 vessels, including 10 Nimitz-series aircraft carriers. During 2016, the US will put a new aircraft carrier into service – the USS Gerald R. Ford. The Navy claims that it needs to grow to 355 vessels.[8]

Figure 1.4 below presents the **deployment of the US fleet** in its various theaters of activity in 2016. The map reflects the shift of the American center of gravity toward the Western Pacific Ocean and the South China Sea, where about 50 vessels are deployed. This shift has meant that the number of warships present in the Mediterranean (the Sixth Fleet) has reached an unprecedented low, and includes only one command vessel and a number of destroyers.[9]

The US Navy is deployed according to the new American maritime strategy, which was formulated together with the Coast Guard and the Marine Corps and announced in May 2015. The strategy sets out for the three aforementioned branches of the navy the principles of planning, organization and use of force that will support US national security and homeland security objectives and US interests. The three new objectives in this strategy are reflected in the slogan: Forward, Engaged, Ready.

8 LaGrone Sam and Eckstein Megan, Navy wants to grow fleet to 355 ships; 47 hull Increase adds destroyers, attacks subs, USNI News, December 16, 2016, https://news.usni.org/2016/12/16/navy-wants-grow-fleet-355-ships-47-hull-increase-previous-goal

9 Highlights of the Department of the Navy FY 2016 Budget, Introduction, P. 1–3.

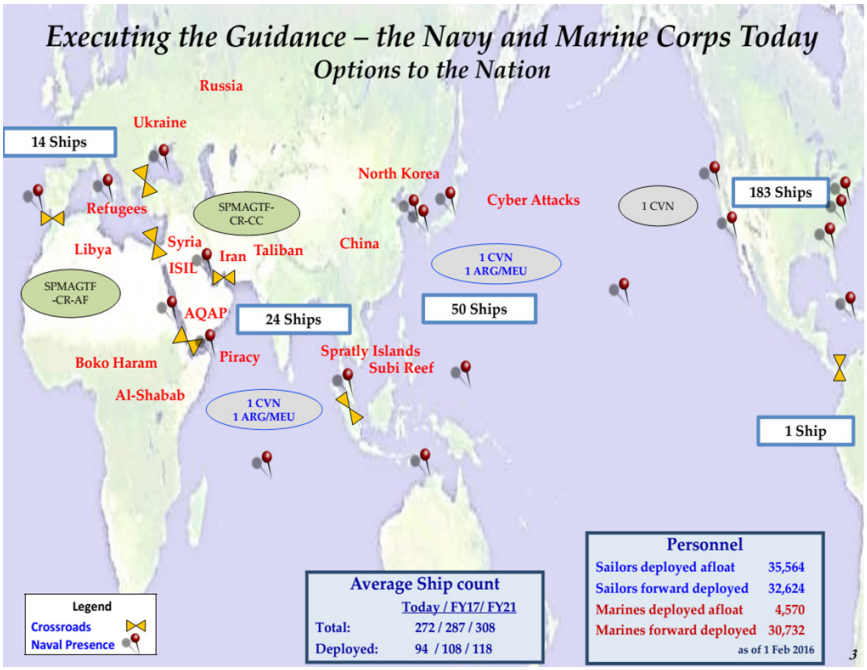


Figure 1.4 Deployment of the US Navy and the alternatives for its operations[10]

The main tasks of the US Navy for 2016-20 are as follows:

- **Protection of the homeland** (maintaining nuclear deterrence, fighting terror, protection of the homeland and providing support to civilian authorities).
- **Build security globally** – (a stabilizing presence across the globe, carrying out missions to maintain this stability, carrying out humanitarian and lifesaving rescue missions in the event of natural disasters).
- **Project power and win decisively** – (delay aggression and defeat it, projecting power despite attempts to limit access to the region, effective action in the cyber domain).

The priority given by the US to the deployment of the Seventh Fleet in the South China Sea and its operations include two main components:

1. The creation of a regional coalition with the participation of countries that are parties to the conflict with China over economic waters.

10 DEPARTMENT OF THE NAVY FY 2017 PRESIDENT'S BUDGET

2. Carrying out air and naval activity that challenges the Chinese claimed delimitation of its economic waters from a row of seven artificial islands being built by the Chinese.

The activity of the American ships and aircraft in the South China Sea, which come under the title "US Freedom of Navigation Operations" creates a risk of conflict with the Chinese. During 2015 and 2016, a number of "close calls" occurred between American aircraft and ships and Chinese aircraft, which almost ended in collision.

The change in the policy of the Philippines (which in 2013 submitted a complaint to the International Court in Hague regarding violation of its EEZ), the desire to withdraw from its special relationship with the US and the agreement of the Philippine leader to resolve the conflict with China by peaceful means, is making it difficult for the US to recruit the support of its allies in the region.[11]

Another region of strategic importance for the US Navy is the **Korean Peninsula**, where North Korea continues to behave as a rogue state and represents a threat to the countries of the region and in particular its neighbor South Korea. North Korea has continued in recent years to carry out nuclear testing and the launch of ballistic missiles, despite the heavy sanctions imposed on it by the UN. The US Navy has deployed its forces in order to project power in this region, including port visits.[12] US Secretary of the Navy Roy Mabus has in recent years made several visits to the region in order to discuss step to tighten bilateral relations to meet developing threats (nuclear and missiles) from North Korea.[13] Even if the region is not defined as the principal arena of the Seventh Fleet, the periodic provocations by North Korea will force it to maintain a presence in the region, even if the new administration of President Trump demands that Japan and South Korea bear the financial burden of this activity, as he declared during his election campaign.[14]

11 The Associated Press, Philippine President Announces Separation from US, AP Asia News, October 20, 2016, http://wtop.com/asia/2016/10/philippine-leader-meets-chinas-president-in-charm-offensive

12 Gamel Kim," North Korea Calls Arrival of US Submarine a 'Direct Threat", Stars and Stripes, Jun 18, 2016

13 The Korean Time, U.S. Navy secretary to meet S. Korea's defense chief over N. Korean issues, World Affairs, August 19, 2016.

14 Sanger David, Haberman Maggie, In Do http://www.nytimes.com/2016/03/27/us/politics/donald-trump-foreign-policy.html?_r=0 nald Trump's Worldview, America Comes First, and Everybody Else Pays, The New York Times, March 26, 2016.

The activity of the Sixth Fleet in the Mediterranean: The deployment of the Fleet in the **Mediterranean** and its size have in the past been influenced by two main factors:

1. The Cold War.
2. A major source of energy (oil).

The end of the Cold War and the drop in the price of oil and gas, as well as increased domestic sources of energy, have enabled the US to reduce its presence in the Mediterranean and the Sixth Fleet has reduced its deployment to only one command ship that relies on a land base in Italy and four Ticonderoga-class missile cruisers, although **the US did send two aircraft carriers** (the USS Harry S. Truman and the USS Eisenhower) **for a short period** in the summer of 2016 in response to Russian activity in the Eastern Mediterranean. In recent years, there has been domestic criticism in the US of the removal of the Sixth Fleet from the Mediterranean and in particular in view of the growing presence of the Russian fleet and its activity in the Mediterranean. This criticism was reflected in the report of the joint committee of the University of Haifa and the Hudson Institute on Security and Energy in the Eastern Mediterranean. The members of the committee, which included Admiral Gary Roughead, a former US Secretary of the Navy, came to the following conclusion: "The desire to disengage from the Middle East and the Eastern Mediterranean is an especially strong element of the general American isolationist impulse…Isolation is not an option. The region's wealth will necessarily influence interests around the world. The questions then are what should be America's strategic vision of the region and what are the organizing principles to increase security, stability and prosperity in the Eastern Mediterranean."[15]

In conclusion, the US fleet is still the largest and strongest navy in the world and has the most diverse capabilities. Nonetheless, **the budget constraints and new challenges in various arenas**, have forced it to set priorities in the use of force, to promote new alliances in regions such as the South China Sea and to encourage NATO to modify its strategy according to the developments in the Atlantic and the Mediterranean. The inauguration of a new US Administration in early 2017 will require it to formulate a stand on the aforementioned issues, including the event of an asymmetric war that is liable to occur in the South China Sea or in the Persian Gulf (against the Iranian Revolutionary Guard), and to decide on the appropriate response to the growing presence of the Russian fleet in the Eastern Mediterranean.

15 Report of the Commission on the East Mediterranean sponsored by the University of Haifa and Hudson Institute P. 41.

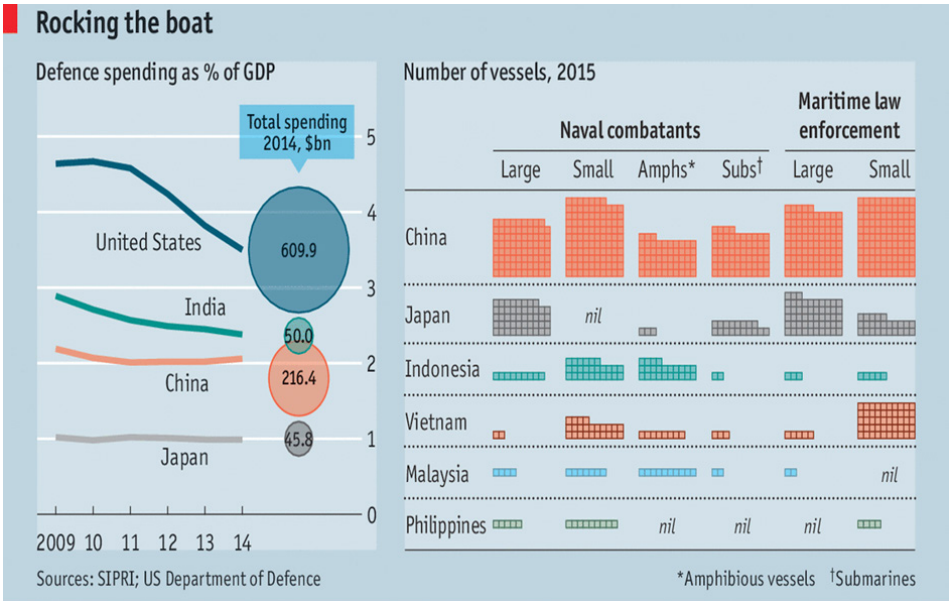


Figure 1.5 Defense expenditure as a proportion of GNP in the US, India, China and Japan and number of vessels in the navies of South China Sea countries

The Chinese Fleet – The People's Liberation Army Navy (PLAN)

The growing importance of Chinese maritime interests and the growth of the **Chinese merchant fleet** (which is the third largest in the world and numbers about 3,600 ships) has led the **Chinese navy** to increase the frequency of its patrols, their duration and their distance from the Chinese mainland. China operates an independent fighting force against maritime pirates in the Indian Ocean. As the operations of the Chinese fleet in distant waters became more technically demanding, China published a **White Paper** entitled "**Defense in Open Seas**".[16] Such a drastic change in Chinese strategy, which until now had sought control of only local waters, reflects China's growing global economic and diplomatic influence. Thus, the priority given by China to its land forces has shifted and it has essentially abandoned its traditional mentality that the land is more important than the sea. The new strategy reflects the growing importance of its ocean activity and the

16 Blasko j. Dennis, "The 2015 Chinese Defense, White Paper on Strategy in Perspective: Maritime Missions Require a Change in the PLA Mindset. The Jamestown Foundation, May 29, 2015. http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews%5Btt_news%5D=43974&cHash=d67db88687507367b668f71cd4199603#.VjH0IPkrLIW

effective protection of its maritime rights and interests. Accordingly, China has had to develop a modern naval force that is necessary for its national security. In order to operate far from its shores, China has completed the construction of an aircraft carrier, the Liaoning, and a second is scheduled to come into service in 2018. Table 1.2 presents the impressive growth in the Chinese battle fleet since the early 2000s and its expected growth until 2020.

The activity of the Chinese navy in the Western Pacific is an important part of China's new maritime strategy and also includes defense components far from its shores. These deployments will continue at the strategic points along the main shipping routes in the **Pacific Ocean** (including the Arctic Ocean where China is showing growing interest) and choke points in the Indian Ocean and the South China Sea.

Friction points that are appearing between the "traditional West" and the "New East" may appear at one or more of the following commons:

- The South China Sea
- The Indian Ocean
- Space
- Cyber space
- The energy resources in the Middle East

In recent years, the disagreement over **China's right to define its economic waters** has received growing attention, on both the operative maritime level and the international level. On July 12th, 2016, the International Court in The Hague handed down a verdict in the ongoing conflict in the South China Sea between the Philippines and China. The verdict rejected China's demand to recognize its sovereignty over most of the territorial waters, the islands and the shoals in the South China Sea. China did not accept the verdict and again announced that it does not recognize the authority of the Court. In October 2016, President Rodrigo Duterte of the Philippines decided to change his country's position on the issue: on the one hand, he is seeking a diplomatic solution with the Chinese and on the other hand is demanding that the Americans evacuate their bases in the Philippines.[17] China knows how to exploit a **creative strategy** in its war over the sovereignty that it is claiming and it is doubtful that China is prepared to give up its control over any territory where it has established military facilities. Also its claim to sovereignty according to the Nine-Dash map will apparently remain relevant at this stage.

17 Bodeen Christopher and Wong Gillian, Philippine President announces separation from US, Associated Press, October 21, 2016 https://www.yahoo.com/news/philippine-leader-meets-chinas-president-charm-offensive-030041553.html?ref=gs

Table 1.2 The Chinese navy – number of vessels including planned[18]

Ship type	2000	2005	2010	2015	2020
Numbers					
Diesel attack submarines (SSs)	60	51	54	57 to 62	59 to 64
Nuclear-powered attack submarines (SSNs)	5	6	6	6 to 8	6 to 9
Ballistic missile submarines	1	2	3	3 to 5	4 to 5
Aircraft carriers	0	0	0	1	1 to 2
Destroyers	21	21	25	28 to 32	30 to 34
Frigates	37	43	49	52 to 56	54 to 58
Corvettes	0	0	0	20 to 25	24 to 30
Amphibious ships	60	43	55	53 to 55	50 to 55
Missile-armed coastal patrol craft	100	51	85	85	85
Approximate percent of modern design					
Diesel attack submarines	7	40	50	70	75
Nuclear-powered attack submarines	0	33	33	70	100
Destroyers	20	40	50	70	85
Frigates	25	35	45	70	85

Source: Craig Murray, Andrew Berglund, and Kimberly Hsu, *China's Naval Modernization and Implications for the United States*, U.S.-China Economic and Security Review Commission (USCC), August 26, 2013, Figures 1 through 4 on pp. 6-7. The source notes to Figures 1 through 4 state that the numbers and percentages "were provided by the U.S. Office of Naval Intelligence. U.S. Office of Naval Intelligence, *PLA Navy Orders of Battle 2000-2020*, written response to request for information provided to the U.S.-China Economic and Security Review Commission, Suitland, MD, June 24, 2013." Citing this same ONI document, the USCC publication states in footnotes on pages 6 and 7 that "Modern submarines are those able to employ submarine-launched

The Indian Navy

India is seeking hegemony in the Indian Ocean and the strategic discourse surrounding its ambitions is occurring at the highest levels of the Indian establishment. **India's** main concern is the territorial aspirations of **its strategic rival in the Indian Ocean – China.** India is concerned about China's intention of transforming the Indian Ocean into a "Chinese Lake", by establishing civilian infrastructures in the ports of other countries in the region (Seychelles and Sri Lanka) and thus increasing the Chinese navy's ability to operate from these ports.[19] In addition, China from time to time sends nuclear submarines to patrol the Indian Ocean, which has led the Indians to increase the number of their maritime surveillance aircraft which have

18 Report submitted to the US Congress in June 2016 by Ronald O-Rourke.

19 Visham Mohamed, China's Xi touts 'maritime silk road' on South Asia tour, Yahoo News, September 15, 2014 https://www.yahoo.com/news/chinas-xi-begins-south-asia-tour-maldives-215155367.html?ref=gs

anti-submarine capability.[20] In October 2015, the Indian navy announced its new maritime strategy, which replaced the strategy from 2007.

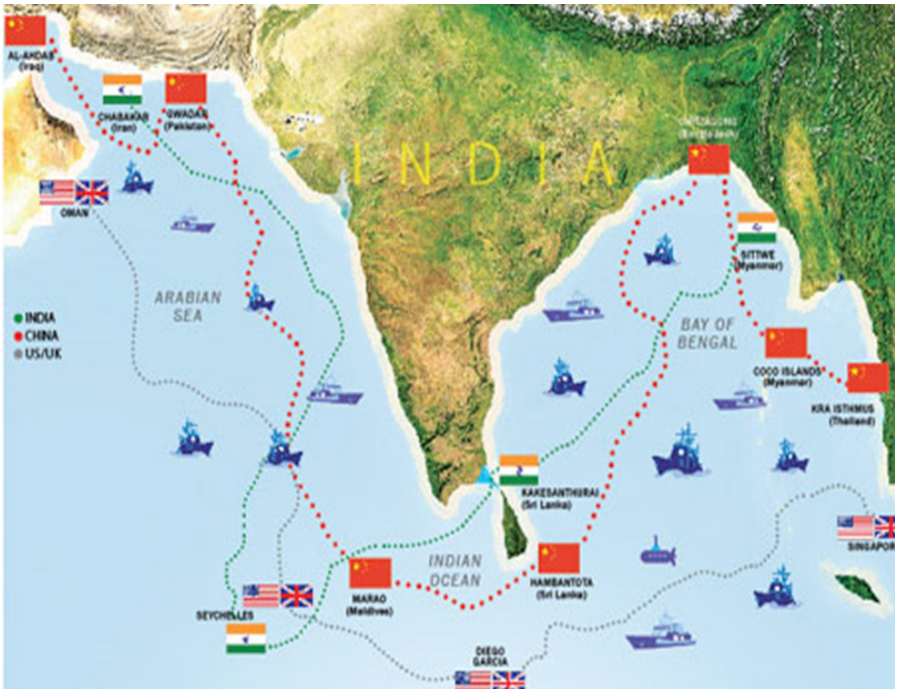


Figure 1.6 Activity of the fleets in the Indian Ocean

The **main differences** between the new strategy and the old can be summarized in the following points:[21]

1. The relation between **India and the Indo-Pacific Ocean** and its influence on India's maritime security.
2. The expansion of the **Indian navy's Areas of interest** (both primary and secondary) which reflects India's desire to become a player with more roles in the region. For example, the Red Sea, which was only of secondary interest in the 2007 strategy, has become an area of primary interest. Also the Gulf of Oman, the Southern Indian Ocean and East Africa have become primary

20 David Rider, More P–81s for India, Maritime surveillance aircraft join Indian Navy, Maritime Security Review, August 1, 2016, http://www.marsecreview.com/2016/08/more–p–81s–for–india/

21 Darshana M. Baruah, India's Evolving Maritime Strategy, India shifts its focus from 'using' to 'securing' maritime security in the Indo–Pacific, the Diplomat, December 03, 2015 http://thediplomat.com/2015/12/indias–evolving–maritime–strategy/

areas of interest from the Indian navy's perspective. Figure 1.6 describes the impressive growth of the Indian commercial fleet which at the beginning of 2015 numbered over 1,000 vessels. India also understands the importance of participating in a regional maritime coalition and in 2015 took part in the Malabar exercise, which included vessels from Australia, Singapore and for the first time also Japan, in addition to the vessels of the Seventh Fleet.

3. **The Indian navy as a net security provider:** The term "net security provider" reflects the ability to monitor, contain and counter. The new strategy focuses on its battle fleet, which is reflected in the expansion of the Indian navy's budget. India is adopting pro-active marine diplomacy in the Indian Ocean and is working to preserve the free passage of trade to and from India, and in particular at choke points of the Indian Ocean (Figure 1.7). By means of this strategy and **closer relations with the US** (without neglecting its special relationship with Russia in the context of the buildup of India's naval power), India hopes to block the threat from China, which is perceived by its leaders as the main threat in the Indian Ocean. In order to guarantee its continued economic growth, India needs to import growing amounts of energy (fuel and natural gas), which has led the Indians to take part in the war against maritime piracy. India is worried by the possibility that **terrorists who originate from Pakistan will make use of the sea lanes**, as happened in Mumbai in 2014. India is also concerned that the stability in the Maldives and/or the Seychelles Islands will be undermined by Jihadist organizations.

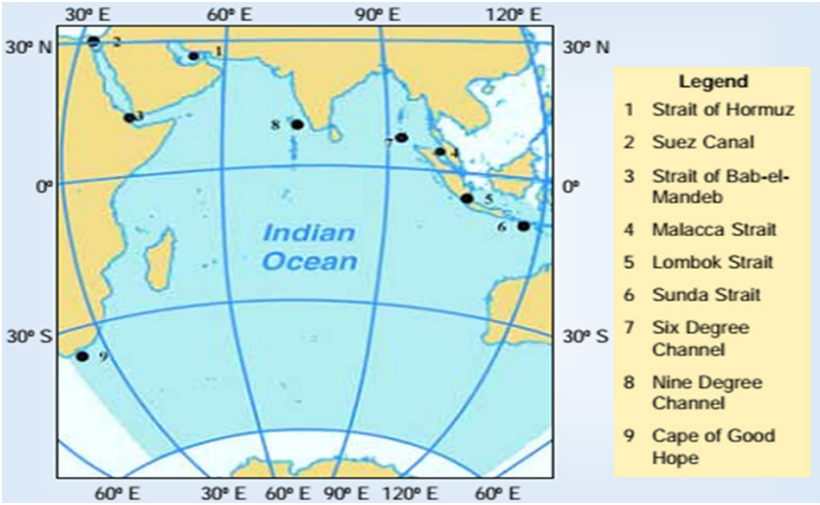


Figure 1.7 Choke points to and from the Indian Ocean

The buildup of power – The Indian military in general and the navy in particular is the largest importer of weapons in the world and they are also making progress in the creation of a defense industry in India itself. The government of Narendra Modi increased the share of foreign defense manufacturers that collaborate with local industry from 25% to 49% in 2014.[22] New vessels are coming into service in the Indian navy at an increasing rate. Almost all of them meet specifications written by the navy itself. Nonetheless, the **management of projects within the various programs is deficient**: The project to build a second aircraft carrier, which began in 2001, was meant to be completed in 2010 but has been delayed and the project launch date is uncertain. In addition, a number of newly built vessels are waiting for the installation of weapons systems whose development is not yet complete.[23] The aircraft carriers that operate as part of the Associate Battle Group are the most important asset of the Indian navy in its activity in the Indian Ocean with regard to the possibility of projecting power in the region. Table 1.3 presents the quantity and types of vessels in the Indian navy.

Table 1.3 Number and types of vessels in the Indian navy

Types of vessels	Number
Aircraft Carriers	2
Amphibious Transport Dock	1
Landing Ship Tanks	9
Destroyers	10
Frigates	14
Nuclear-Powered Attack Submarine	1
Conventionally-Powered Attack Submarines	14
Corvettes	24
Mine Countermeasure Vessels	7
Large Offshore Patrol Vessels	10
Fleet Tankers	4

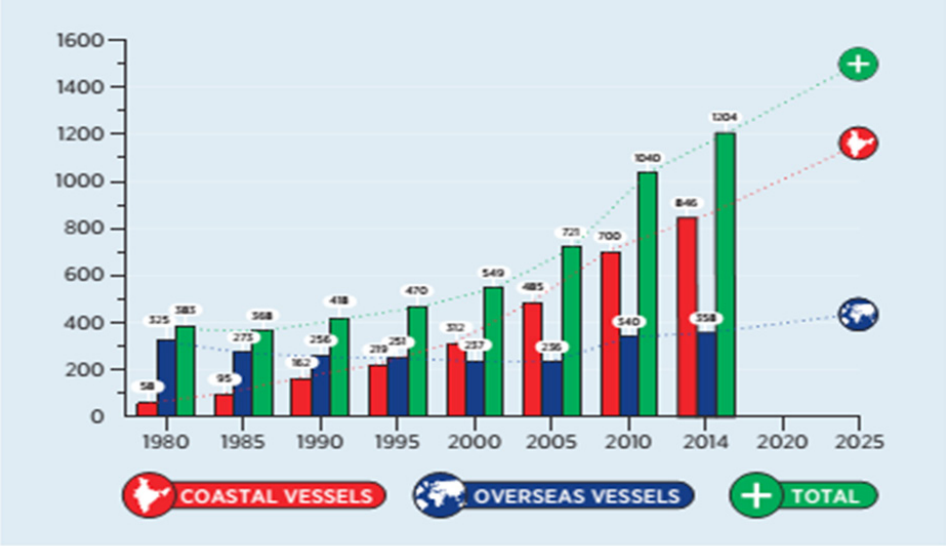
Nuclear Deterrence – India is soon to complete the construction of the third leg of the nuclear triad, which is based on Aridhant nuclear subs, developed by the Indians about two decades ago. During the year, the submarine completed its sea trial and is meant to complete the testing of its weapons systems during the

22 Gady Franz–Stephen, Is India's Defense Budget Adequate? New Delhi's defense spending will rise modestly in the new fiscal year, The Diplomat, March 03, 2015. http://thediplomat.com/2015/03/is–indias–defense–budget–adequate/

23 Rahul Singh, That Sinking Feeling: Navy struggles to bridge its capability gaps, Hindustan Times, New Delhi, September 29, 2016. http://www.hindustantimes.com/india–news/that–sinking–feeling–navy–struggles–to–bridge–its–capability–gaps/story–p0atXgjXpeGF3fUva4NofM.html

coming year. India has begun the construction of a second sub and will eventually complete the building of four subs, giving it second strike capability.[24]

Plan to build up the power of the Indian navy (achieving a level of 200 vessels) has been the target of criticism, both domestic and foreign. The main claim is that it is sufficient to build a navy that will deny the ambitions of China and for this purpose to rely on nuclear deterrence that will help maintain order in the region.



As on 01 January 2013, India was ranked 17th in the world in terms of Dead Weight Tonnage (DWT) with a global share of only one percent.

As on 31 December 2014, India had a fleet strength of 1,204 ships with Gross Registered Tonnage (GRT) of 10.31 million. Of this, 358 ships with 9.09 million GRT were deployed for overseas trade and 846 ships with 1.22 million GRT for coastal trade.

Source: *MoS/GoI Annual Report 2014 – 2015 and Ministry of Road Transport and Highways Transport Research Wing/GoI Indian Shipping Statistics 2014 (data extrapolated to 2025).*

Figure 1.8 The growth in the Indian commercial fleet[25]

The Russian Navy

Since the beginning of the recent wave of reforms in the Russia military in 2009, the Russian leadership has been conveying the message that the Russian navy is emerging from a period of crisis, is returning to its former status and is capable

24 Rakesh Krishnan Simha, Birth of a Boomer: How India Built its Nuclear Submarine, Swarajyamag – Read India Right, October 23, 2016, http://swarajyamag.com/defence/birth-of-a-boomer-how-india-built-its-nuclear-submarine

25 Indian Navy – Naval Strategic Publications (NSP 1.2) October 2015.

of carrying out the missions of a superpower's navy. This was recently manifested in two events:

1. **The annexation of Crimea** and the attainment of Russian control over the port city of Sevastopol, which is the home port of the Russian navy in the Black Sea and is near the Russian navy's shipyards, which play an important part in its maintenance operations.
2. **Expansion of naval missions** in its six theaters of operation (the Atlantic Ocean, the Arctic Ocean, Antarctica, the Indian Ocean, the Caspian Sea and the Pacific Ocean), with priority given to the permanent presence of the Russian navy in the Mediterranean and increasing its power in the Atlantic Ocean and the Arctic Ocean.

On July 26, 2015, which is also Russian Navy Day, President Putin approved the **New Maritime Doctrine of the Federation**. The document describes the strategy of the Russian navy, its missions and the plan for its buildup of power. This doctrine replaces the previous one approved in 2001. During the launching ceremony of a new nuclear submarine named after Prince Vladimir in July 2012 at the Severodvinsk shipyard on the coast of the White Sea, President Putin reiterated **his personal commitment to building up the strength of the Russian navy** and described its main missions.[26]

In 2016, the Black Sea Fleet continued to increase its **presence in the Mediterranean**. Commentators claim that the Russians' goal is to make the Eastern Mediterranean **inaccessible to the navies of the US and its allies in times of crisis** (anti-Access/Area-Denial). If indeed this is accomplished, it is liable to restrict the access of the US and its allies to the Suez Canal, to the Black Sea and to the region of the Eastern Mediterranean. The American concern with the situation was recently expressed by Admiral John Richardson, the new Secretary of the Navy, who urged the senior commanders of NATO to update the alliance's naval strategy to meet this development,[27] although at the same time he called on them not to use the term "anti-access/area-denial".

The Russian attack submarine fleet which has been the largest in the world for two decades, has in recent years been patrolling and demonstrating its power

26 The Voice of Russia, Revival of Russian Naval Forces, President Vladimir Putin Announced at a Session Convened to discuss the process of fulfilling the state armament program, 31 July 2012. https://sputniknews.com/voiceofrussia/2012_07_31/New-image-of-the-Russian-Navy/

27 Barnes Juliane, Top U.S. Admiral Says NATO Should Rework Maritime Strategy, The Wall Street Journal, Oct 22, 2015.

in a number of theaters: opposite the coasts of Scandinavia and Scotland, in the Mediterranean and in the Northern Atlantic. This activity is perceived as threatening the dominance of the submarine force of the US and NATO in these regions. In the spring of 2015, Admiral Mark Ferguson, the Commander of American Forces in Europe, declared that "the intensity of Russian submarine patrols had risen by almost 50 percent over the past year."[28] As part of its littoral warfare, the Russian navy in the Eastern Mediterranean recently demonstrated its ability to carry out **an attack against land targets** by means of cruise missiles launched from both the Caspian Sea and the Mediterranean. American commentators pointed out that the launch of the cruise missiles from the region of the Caspian Sea or from the Black Sea, where the Russians maintain naval and air control, provides these vessels with **almost complete survivability**.[29]

In summary, despite Russia's troubled economic situation in recent years, the Russian navy has been given priority over the other military branches in the allocation of resources. The Russian navy is used to achieve geopolitical and geostrategic goals and in a certain sense presents the US and NATO with behavior patterns that resemble those of the **Cold War**. Also **its number of navy vessels** (272 as of August 2016) is similar to that of the US Navy. During 2015 and 2016, **the Russian navy tightened its relations with the Chinese navy**, and they held joint exercises in the Mediterranean, a joint amphibious exercise on the eastern coast of Russia and also a joint exercise in September 2016 in the South China Sea. The spokesman for the Russian navy stated that they "are not directed against any third party and are not linked to any geopolitical changes in the region" but the facts prove differently.[30]

NATO – the North Atlantic Alliance

The naval forces of NATO were occupied with two main tasks in 2016: **maritime security operations in the Mediterranean** and **anti-piracy activity** in the Indian Ocean. In addition, they carried out rescue missions during the refugee crisis in the Aegean Sea.

28 Schmitt Eric, Russia Bolsters Its Submarine Fleet, and Tensions With U.S. Rise", The New York Times, April 20, 2016.

29 Fink Andrew, Troubled Waters, Russia, Iran and Inland Seas – A bastion strategy for the second nuclear age, The American Interest, April 15, 2016.

30 Sputniknews, Russian–Chinese Naval Exercise Cooperation 'Highly Effective', Sputnik Military & Intelligence, September 12, 2016. https://sputniknews.com/military/20160912/1045205912/russia–china–naval–cooperation–effective.html

The composition of NATO's naval forces, including the American contingent, is presented in Figure 1.9. In February 2016, NATO sent three warships to the Aegean Sea in order to assist in stopping the flow of refugees who were traveling by boat from the coast of Turkey to Greece in search of political asylum. The force was sent on this mission without clearly explaining to its commanders what is expected of them with regard to the rescue of human lives.

Figure 1.9 The composition of the NATO naval force by type of vessel, including the contingent of the US Navy

In June 2016, NATO held a large-scale joint exercise together with the Sixth Fleet in the **Baltic Sea**, which involved 40 vessels and over 6,000 sailors. The exercise also included an amphibious landing in the Baltic Sea and surveillance by the

Russian navy that was reminiscent of the Cold War. This region is becoming one of the friction points between NATO and the Russian navy.[31]

For reasons to be discussed below, **NATO is not managing to modify its operating doctrine** to the changing circumstances of the maritime arena. At the NATO summit meeting in Warsaw in July 2016, NATO leaders decided to replace **Operation Sea Endeavor** instituted in 2001 with **Operation Sea Guardian** which is meant to facilitate the carrying out of broader and more diverse missions in the Mediterranean. It is worth noting that in June 2011 NATO published the **Alliance Maritime Strategy.** Its authors claim that this strategy "will help steer the transformation efforts of the Alliance and will need to be implemented in line with prevailing budgetary circumstances... It aims to ensure that the Alliance continues to have the effective and flexible maritime forces it needs to meet the diverse security challenges of the 21st century."[32]

Maritime anti-terror and anti-piracy warfare in the Indian Ocean

Maritime piracy and terror constitute a serious threat to the safety of shipping, human life and human welfare, in addition to the fact that they harm relations between countries when they originate from the territory of one of them. Currently, it is still possible to differentiate between **maritime piracy** and **maritime terror** according to the nature of the attacks, the methods used and the means employed, as well as the regions in which maritime terror and piracy take place. Although there is similarity between the methods each uses (attacks on ships, theft of maritime cargo and taking of hostages), their goals differ: terror activity has an ideological motivation and therefore, for terrorists, publicity is important in order to create psychological pressure on governments and the public, while pirates use the property they seize and the hostages they take only for economic gain. Therefore, it can be said that there are common factors in the activity of terror and piracy, but they have different motivations.

During 2016, the Combined Maritime Force continued its activities **against maritime piracy and terror in the Western Persian Gulf,** the Indian Ocean and the Horn of

31 Nordenman Magnus, Analysis: Baltic Sea Heating Up as Friction Point Between U.S, NATO and Russia, US Naval Institute News, April 25, 2016.

32 North Atlantic Treaty Organization, "Alliance Maritime Strategy", e – Library Last updated: 17 Jun. 2011, http://www.nato.int/cps/en/natohq/official_texts_75615.htm

Africa.[33] The Combined Maritime Force has 31 member countries. Its headquarters are located in Manama in Bahrain and it is commanded by the Commander of the US Fifth Fleet and the US Central Command. It is worth mentioning that apart from this force, a number of countries, such as **China,** are involved in this activity independently.

The results of this activity indicate that already in 2015 there was a 15% drop in pirate activity in the aforementioned region. According to International Crime Services, in 2016, there was only one incident, which occurred in April (as compared to 237 in 2011).[34] Nonetheless, the hijacking of local ships continues near the coast of Somalia and the number of hostages held for ransom by the pirates still remains high (see Figure 1.12 below).

The economic and human cost of anti-piracy activity, as presented in Figure 1.10 below, **still remains high**. This is due to, among other things, the payment to maritime security companies, of which there were more than 140 in 2016, which provide consulting, training and weapons for ships and their crews.

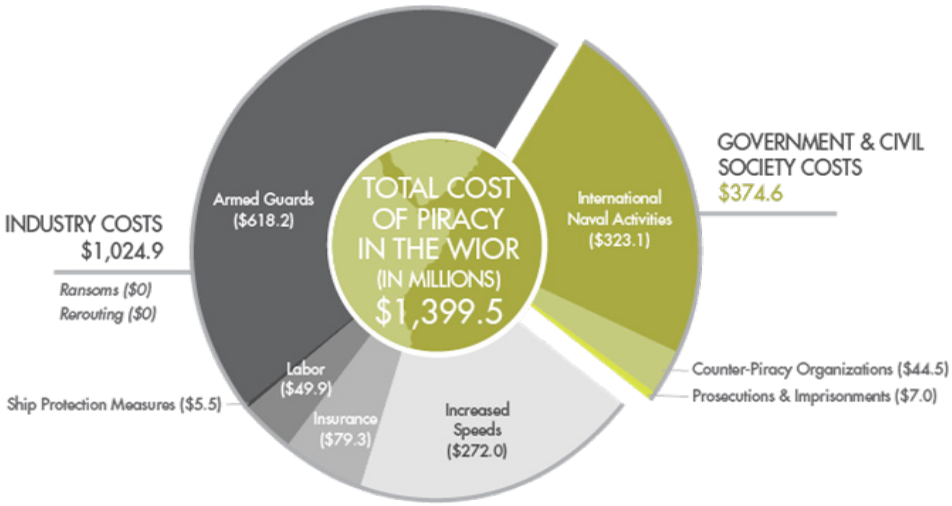


Figure 1.10 The economic cost of pirate activities by categories

33 Australia, Bahrain, Belgium, Canada, Denmark, France, Germany, Greece, Iraq, Italy, Japan, Jordan, Republic of Korea, Kuwait, Malaysia, the Netherlands, New Zealand, Norway, Pakistan, The Philippines, Portugal, Saudi Arabia, Seychelles, Singapore, Spain, Thailand, Turkey, UAE, United Kingdom, United States and Yemen.

34 Commercial Crime Service, Live Piracy & Armed Robbery Report 2016, Attack Number: 058–16 Date: Sun Apr 24 2016 Type of Vessel Product Tanker. https://icc-ccs.org/piracy-reporting-centre/live-piracy-map/details/151/1196

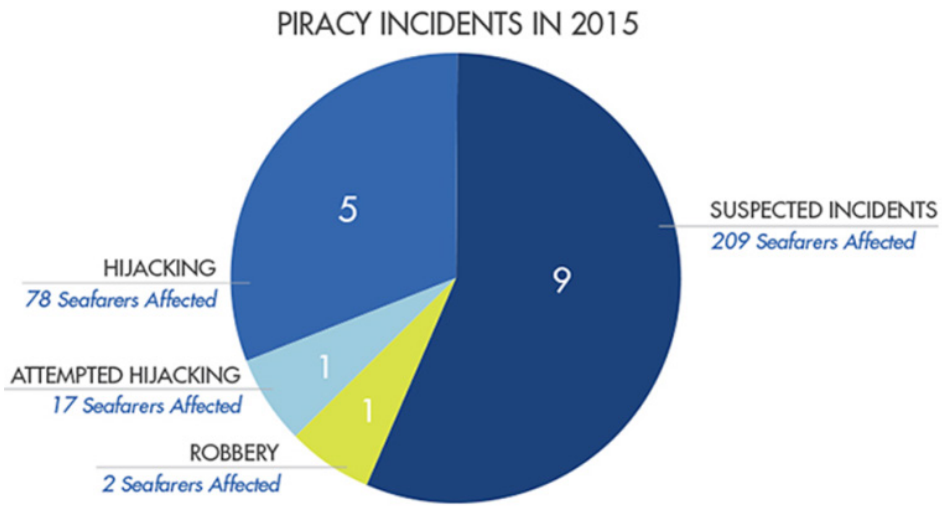


Figure 1.11 Number of piracy incident reported at east Africa on 2015

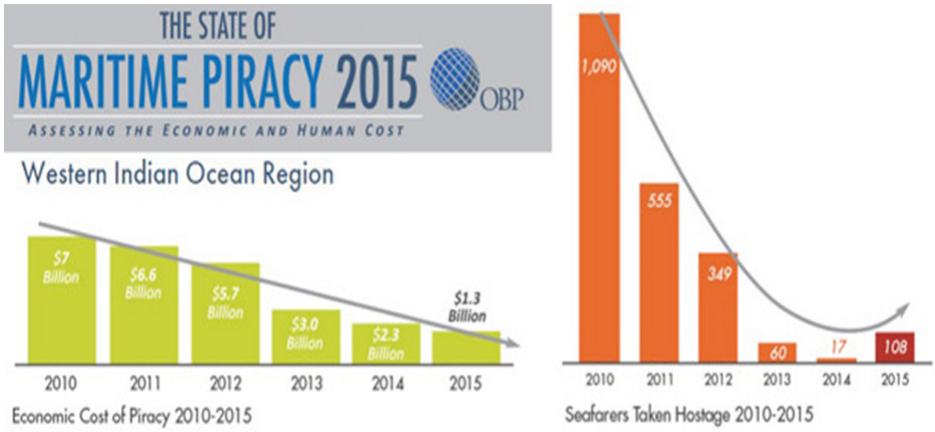


Figure 1.12 The state of maritime piracy in 2015 -2010 (west Indian ocean region)

The **likelihood of terror attacks** by organizations such as Al Qaeda and ISIS in this region are estimated to be high, in view of the declared intention of these organizations to disrupt the flow of commercial shipping in critical shipping lanes. The results of a terrorist attack of this type in the Gulf of Aden area are liable to have severe consequences for trade and the global economy. This region has three choke points that are important to global trade (Figure 1.7 above): the Suez Canal, the Bab el Mandeb Strait and the Strait of Hormuz, through which passes about 20% of global oil trade. The shipping through these choke points

can be disrupted with relative ease (by means of, for example, naval mines).[35] The fighting in Yemen increases the level of instability in the region. Thus, in April 2016, a local faction of Al Qaeda (Al Qaeda in the Arabian Peninsula) used **explosive boats** to attack the commercial port facilities in the city of Makalla and in October 2016 the Houthis used **coast to sea C-802 anti-ship missiles** to attack a ship of the United Arab Emirates, which was sailing near the port city of Moka and was carrying humanitarian aid.[36] In addition, in October 2016 an American destroyer, the USS Mason, which was patrolling in the area of the Bab el Mandeb Strait, was forced to defend itself and another ship, the USS Ponce, against a number of similar missiles that were fired at it from the Yemenite coast. It did so by using anti-missile missiles and a decoy system.[37]

Rogue nations such as Iran and North Korea employ forces whose mode of operations is similar to that of terror organizations. Notwithstanding the nuclear agreement signed in 2015 between the West and Iran, the aggressive activity of Iran's Revolutionary Guard continued in 2016 in the Persian Gulf region. This activity was backed by a declared threat by the Iranian Assistant Chief of Staff, Ali Shadmani, made in July 2016, to close the Strait of Hormuz.[38] These threats are manifested in provocative activity by navy vessels belonging to the Revolutionary Guard, which on a number of occasions have come threateningly close to vessels of the US Fifth Fleet which patrols the region. In one incident, in January 2016, they even captured American sailors and humiliated them during their interrogation.[39]

In summary, although the attacks on ships by terrorist organizations have been less frequent than maritime piracy incidents, a broader perspective indicates that both the **capability** possessed by these organizations and their **intentions** of

35 Church Chris, Naval commanders warn of terror threat against commercial shipping, Stars and Stripes April 9, 2016.

36 Charkatli Izat, UAE warship obliterated off the coast of Yemen, Al-Masdar Al-'Arabi AMN, October 1, 2016. https://mobile.almasdarnews.com/article/uae-warship-obliterated-off-coast-yemen/

37 LaGrone Sam, USS Mason Fired 3 Missiles to Defend From Yemen Cruise Missiles Attack, The US Naval Institute, October 11, 2016. https://news.usni.org/2016/10/11/uss-mason-fired-3-missiles-to-defend-from-yemen-cruise-missiles-attack

38 TheTower.org Staff, Iranian General Threatens to Shut Down Straits of Hormuz if U.S. "Makes a Small Mistake", the Tower Magazine, July 29, 2016, http://www.thetower.org/3712-iranian-general-threatens-to-shut-down-straits-of-hormuz-if-u-s-makes-a-small-mistake/

39 Times of Israel staff and AP, US sailors divulged information during Iran capture. Faulty equipment, poor judgment, lax oversight led to shameful January incident, Navy report says, accusing Iran of violating international law, The Times of Israel, July 1, 2016, http://www.timesofisrael.com/us-sailors-divulged-information-during-iran-capture/

carrying out an attack of this type constitute a real threat. The existence of three maritime choke points in the Middle East (the Strait of Hormuz, Bab el Mandeb and the Suez Canal), which are close to the strongholds of ISIS and Al Qaeda, provide them with relatively easy access to shipping and raise the probability of their occurrence. Evidence of the fear among American officials of a terror attack of this type can be found in the evaluation requested from the Brookings Institute of the scenario of an attack on tankers carrying cargo such as liquefied natural gas, oil and chemicals, in order for it to recommend ways of dealing with this kind of threat.[40]

Immigration along the sea routes

The migration of refugees by way of the Mediterranean to Europe is not a new phenomenon and has already in the past cost the lives of refugees trying to cross the Mediterranean to Europe. But the movement of refugees has intensified during the last decade due to the **civil war in Syria and the African refugees who are embarking primarily from the coast of Libya**. This migration is described by The International Organization for Migration as "the biggest movement of people since World War Two."[41] Although the majority of refugees remain in the countries neighboring their homeland, many choose to continue on to other destinations, such as Turkey, and from there join the flow of immigrants from Southwest Asia and Afghanistan in an effort to reach the coast of Greece by boat. Alternative routes by way of Egypt, Sudan and the Sahara are used by refugees from Eritrea to get to the shores of Libya and from there to the shores of Southern Europe. The years 2015 and 2015 saw record numbers of refugees arriving in Europe by sea (see tables 1.4, 1.5).

A total of 278,201 refugees arrived in Europe up until the middle of August 2016, of which 266,042 arrived by sea. About 3,151 drowned on the way.

The EU-Turkey Refugee Deal which was signed on March 20th between the 28 EU countries and Turkey was intended to reduce the flow of refugees arriving by sea and in particular by way of Greece; however, its effectiveness is still unclear.[42]

40 Alex Hall, Tess Hellgren. Lucia Retter, Giacomo Persi Paoli, Examining the Possible Consequences of a Deliberate Attack on Tankers, Rand Corporation Europe. http://www.rand.org/randeurope/research/projects/tanker-attack-consequences.html

41 The Economist, Europe's boat people for those in peril, April 25th, 2015.

42 Kingsley Patrick, Rankin Jennifer, EU-Turkey refugee deal – Q&A, The Guardian, March 8, 2016, https://www.theguardian.com/world/2016/mar/08/eu-turkey-refugee-deal-qa

Table 1.4 Number of refugees arriving in Greece during 2015-16[43]

Total between Jan. 1 2015 and Aug. 11 2016	1,020,695
Total for 2016	163,332
Total by sea in 2016	161,594
Total by land in 2016	1,738
Total in 2015	857,363
Type	First country in Europe to which the refugees arrived

Table 1.5 Number of refugees arriving in Italy during 2015-2016

Arrival of refugees in Italy starting from August 15, 2016	
Total from January 1, 2015 to August 15, 2016	255,786
Total in 2016	101,944
Total in 2015	153,842
Type	First country in Europe to which the refugees arrived

Maritime environmental protection and global trends in maritime planning

The oceans, seas and coastal areas constitute an **integral and essential component of the global ecosystem** and are essential to the continued utilization of its resources. There is a need to oversee the ongoing exploitation of the oceans, the seas and the resources they contain, even if it appears that they can be used to wipe out poverty, ensure economic growth and food security and create employment. Alongside the oversight over the usage of these resources, there is a need to protect the maritime environment in all its aspects and including **the response to the effects of climate change**.

The Regional Seas Convention and the Action Plans (triennial) are intended to achieve these goals, by deepening the involvement of the signatory countries, through appropriate national legislation and the adoption of monitoring and control mechanisms. This will require partnership between civil society and the private sector, the buildup of capabilities, the allocation of national and international funding and the creation of a mechanism and process to assess progress.

The three-year Action Plan for 2013-2016 is about to end and the **2017-2020 Action Plan** has been drawn up and approved by the 143 member countries, which represent 13 different regions around the world. The difficulties in carrying out the Plan are

43 IMO and the local authorities, as of August 2016.

primarily political and financial. Since this report focuses on the Middle East, the environmental threat is primarily to do with the sea and its source is **activity that causes pollution of the maritime environment** and as a result affects both the quality of life and the fisheries in the region.

Israel has signed the **Barcelona Convention** for the protection of the Mediterranean from pollution, which includes six Regional Activity Centers (RACs). However, the civil wars in some of the Middle East countries and/or hostile relations between the countries, and in particular between Israel and its neighbors, have hindered the implementation of the plan. Israel has signed the Barcelona Convention but has not yet ratified all of its protocols and similarly has not yet declared 10 percent of the fisheries in its sovereign waters as protected maritime territory, although its signature on the Convention for Biological Diversity (CBD) commits it to do so by 2020.

Conclusion

The world is in the midst of far-reaching global changes which will have broad implications in the maritime domain. In this sense, the year 2016 has reinforced the trends that appeared at the beginning of this decade.

In addition **to the US, which remains the strongest maritime superpower, China and India have become regional superpowers**, which is reflected in the **quantity and quality of their ships.** These two superpowers are expanding the **nuclear deterrent capability** of their underwater fleet, which is evidence of their ambitions to expand and extend their naval operations to well beyond their shores. **The new US administration**, which during the election campaign did not make any specific policy declarations as to its future operational strategy in general and in the maritime domain in particular, has not yet clarified its stand on some of the issues discussed in this report.

According to the traditional strategy approaches, the question that arises with respect to both China and India (who have been adversaries since the military conflict in the Himalayas in 1962) is the following: **Are they choosing to discard their continental image and do they envisage a maritime role**, or, in spite of the huge investment of resources in building a navy that has deterrent ability and is able to project power, will they remain **faithful to the continental component which has greater geostrategic importance?**[44]

44 Zorawar Daulet Singh, India's Geostrategy and China: Mackinder versus Mahan? Journal of Defense Studies, Vol. 7, Issue 3, pp. 137–146, 2013.

The Russian navy is rebuilding its capabilities, increasing its number of ships and adopting a new operational doctrine. It is presenting the navies of the US and NATO with operational challenges in the various theaters, such as the Black Sea and the Eastern Mediterranean, the Baltic Sea and the North Pacific. The Russians are fully exploiting geopolitical opportunities (such as in Syria and Iran) in order to deploy their navy and air force and in this way create a situation in which they are **pushing the American navy out of the region** (even if this only appears to be so). During 2015 and 2016, **relations became closer between the Russian and Chinese navies** and they carried out joint exercises in the Mediterranean and the South China Sea and off the eastern shores of Russia. Essentially, a naval axis is developing that is a counterweight to the coalition that the US is trying to create with the countries in the region.

Climate change in the Arctic Ocean region is creating opportunities for the exploitation of resources and the shortening of shipping routes. These phenomena are acting as a catalyst for countries such as Russia and China who are building up their navies for future activity in this region.

It appears that the **war against maritime piracy in the Indian Ocean** is meeting with success, although a large amount of resources is being invested. Despite the nuclear agreement between the superpowers and Iran, the **Revolutionary Guard's navy** continues to operate aggressively in the Strait of Hormuz region and is managing to embarrass the Western navies present in the region.

Maritime terror has still not made any impressive achievements like the terrorist successes in Syria, Iraq and Afghanistan, but it is expected that with the support of rogue nations and terrorist organizations such as ISIS and Al Qaeda, it is likely to overcome existing obstacles and in particular in the waters of failed states.

Chapter 2: The Red Sea and the Persian Gulf, and influences from the Indian Ocean

Benni Ben Ari

General

Admiral Alfred Mahan, the geostrategist of the American Navy, once said: *"Whoever controls the Indian Ocean will dominate Asia. The destiny of the world will be decided in its waters".*[1]

In 2015 there were about 100,000 vessels afloat on the Indian Ocean and its tributaries, carrying about 60% of the global maritime trade, including half the number of containers, one third of general cargo, 80% of petrol tanker traffic, and 50% of fishing boats. This does not include the illegal trade in the region, such as drug smuggling, illegal migrant trafficking, and marine piracy.

Some of the countries along the shores of the Indian Ocean also have strategic, economic and political interests in marine regions far from the countries themselves. In recent years, the importance of the Indian Ocean and its tributaries has increased enormously, particularly due to its heavy maritime traffic which is channeled through a number of strategic points (Choke Points). These choke points include the Suez Channel, the Straits of Malacca, the Straits of Hormuz, the Straits of Bab El Mandeb and others. Accordingly, the countries in the region, led by India and China, have updated their marine strategy, and they are strengthening their interest and marine activity and operations in this arena.

The north-west area of the Indian Ocean, which includes the Arabian Sea and the tributaries of the Persian Gulf and of the Red Sea, has great strategic importance. The Red Sea, which forms the north-western tributary of the Indian Ocean leads to the Suez Canal, which was widened in 2015. This forms the route for most of the trade between Asia and Europe. It is also the maritime route from Asia to the southern port of Israel, the Eilat Port.

The Persian Gulf, which represents a tributary of the Indian Ocean that divides the Arabian Peninsula and Iran, has vast economic and geostrategic importance, mainly as a source of crude oil (production), from where this oil is exported in petrol tankers all over the world. In the Israeli context, the Persian Gulf in many cases

1 Alfred Mahan: China and the Indian Ocean Region, edited by Dr. Sidda Goud, Manisha Mookherjee.

serves as the starting point for the smuggling and transfer of weapons originating in Iran to Palestinian terror organizations. The ships carrying the weapons usually arrive in Port Sudan on the shores of the Red Sea. From there the weapons are taken overland to Egypt and the Sinai Peninsula, such as the case of the vessel Karine A which was seized in January 2002, and the vessel Klos C that was seized in March 2014.[2]

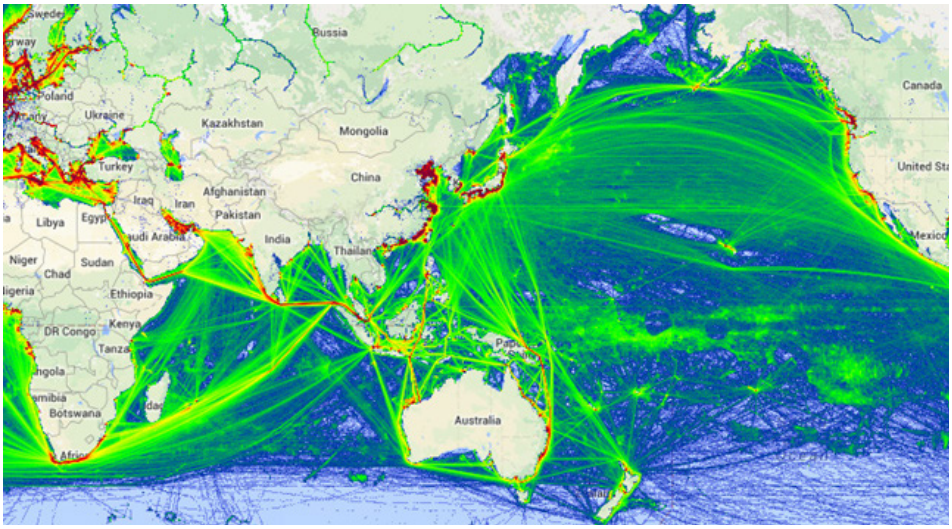


Figure 2.1 The Indian Ocean, choke points and traffic density on this global maritime route in 2014.

Around the west of the Indian Ocean, including the Arabian Sea and its tributaries, there is a presence of the Iranian Fleet, part of an independent Iranian force combating piracy. This force demonstrated Iranian marine presence around the Bab El Mandeb Straits in the framework of Operation Decisive Storm[3] against the Houthis, a militant Islamist-Shiite organization operating in Yemen against the regime, with the support of the Iranians. In October 2016 (after the official end of the Operation in 2015), the Houthis, using a shore-to-sea C-802 missile, attacked a ship of the United Arab Emirates (UAE) in the Bab El Mandeb Straits area. This ship was severely damaged. In October 2016, in the same area and in two separate

2 Announcement from IDF spokesperson: http://www.idf.il/1133-20437-HE/IDFGDover,aspx

3 A military campaign involving a coalition of Arab and Muslim (Sunni) countries, which began in March 2015, with the aim of driving back the Houthi rebels who had captured large parts of Yemen, and helping the deposed President Abd Rabo Mansour Hadi to regain control of the country.

incidents, the American destroyer Mason was attacked. The destroyer diverted the missiles fired at it and escaped these incidents without damage.

The Arabian Sea region has also seen several attacks by Sunni Muslim organizations. These include the attack in the Port of Aden in October 2000 on the American destroyer Cole by a suicide boat of Al Qaeda operatives, and the attack on the commercial port in the town of Mukalla in April 2016, where a local branch of Al Qaeda (Al Qaeda in the Arabian Peninsula) used exploding boats to attack the port's infrastructures. In the western part of the Indian Ocean, following a Security Council resolution, there is a combined task force to combat piracy, as well as independent forces from a number of other countries.

Important Navies in the Indian Ocean Arena

The Indian Fleet and India's Maritime Strategy

An examination of the strategic activity of India shows that it sees itself as a country with central influence over what happens in the Indian Ocean. This perception has a historical dimension, since for several decades India has been the heir of the British Empire with respect to control of the Indian Ocean, and a strategic dimension, starting from the 1980s, the period when India began to develop a large, modern fleet following changes and developments in marine security requirements. Later, the Indian strategic perception developed into a concept of the Indian Ocean and the western part of the Pacific Ocean as one area (the Indo-Pacific).

The Indian Navy has significantly widened the marine areas where India has a strategic interest, and divided them into two groups. The first consists of regions of prime importance, while the second consists of regions of secondary importance. The whole area covers all the Indian Ocean and seas linked to it directly and indirectly.

The first group includes all of India's coastline and regions defined in the Maritime Convention (territorial waters, EEZ etc.). This group also includes the Arabian Sea, the Bay of Bengal and the Andaman Sea (with their coasts), the Persian Gulf (including the coasts), the Gulf of Oman and the Gulf of Aden, the Red Sea and its coasts, the south west of the Indian Ocean, and all the choke points in the area, as well as all areas crossed by Indian maritime trade lines and oil transportation routes.

The second group, areas of lesser importance, includes the south east of the Indian Ocean, and places where it joins the Pacific Ocean; the south and east of the China Sea, the west of the Pacific, the south of the Indian Ocean (including Antarctica), areas where India has political and economic interests, and areas where Indian diaspora live.

The definition of the areas and their expansion is a sure sign of the intention of the Indian navy to take a position and be more actively involved in the arena. Some examples are the Persian Gulf area, the Red Sea area, and others, which have become of primary importance, notwithstanding their distance from the Indian coast. The South China Sea, on the other hand, in spite of events and activity there in recent years, is one of the secondary regions, apparently because of an intention to avoid direct involvement in clashes between the Indian navy and the Chinese navy.

In the framework of building the Indian naval strength, we should mention in particular the start of operational service of the first Indian nuclear submarine, INS Arihant, in February 2016. The body of this submarine, which is driven by nuclear power and can carry long-range missiles with nuclear warheads, was launched back in 2009. Since then it has undergone a series of marine tests and tests of its weapons systems.[4]

The Indian Navy is also equipped with an aerial arm, which in addition to MIG 29 planes on aircraft carriers, also has a large number of helicopters located on vessels for the purpose of warning and combating submarines, and eight new P81 planes made by Boeing, equipped with Harpoon missiles, unmanned aircraft and other advanced means for patrolling the seas and locating submarines.

Figure 2.2 Vessels of the Indian Navy

4 http://www.thehindu.com/news/national/Now-India-has-a-nuclear-triad/article16074127.ece

The Saudi Arabian Navy

Saudi Arabia is the world's largest oil exporter. Geographically it is surrounded by three choke points, so that its maritime security and strategy are of primary importance. Saudi Arabia's traditional rival in the region is Iran. The rivalry is driven by differences of religious ideology, mainly by the divide between the Sunni majority and the Shiite minority in Islam. The fact that the Persian Gulf is the body of water that separates the two countries obliges Saudi Arabia to maintain sufficient naval capability to counter the danger of Iranian expansion, which has already explicitly threatened to close the Straits of Hormuz.[5]

The development of the Saudi navy as a guardian force in the Persian Gulf and the Red Sea actually began back in 1972, with the start of the Saudi Naval Expansion Program (SNEP) in collaboration with the United States. The purpose of the plan was to enlarge and modernize the fleet of vessels and the naval bases in both arenas, mainly in order to balance the naval strength of Saudi Arabia against the fleet of the Shah of Iran. After the Iranian Revolution, between 1980-1990, the Saudi navy was reinforced with French-made frigates. In 2013 dozens of light patrol ships of the Mark V type were purchased from the USA, mainly to protect the oil installations and the areas of Saudi Arabia's Exclusive Economic Zones. Today all the large vessels are equipped with modern weapon systems and carry sea-to-sea and sea-to-air missiles. In addition, the Saudi Navy has dozens of helicopters (some stationed on ships) for patrol, detection and anti-submarine warfare purposes.

In October 2015, the USA approved in principle the sale to Saudi Arabia of four LCS (Littoral Combat Ships) of the Freedom class, with associated equipment. The total value of the deal is 11.5 billion dollars.[6] According to unofficial reports, Saudi is seeking to purchase some 209 model submarines from Germany, and in future to increase its submarine fleet, although at present it appears that Saudi Arabia is still very far from such a purchase.[7]

5 TheTower.org Staff, Iranian General Threatens to Shut Down Straits of Hormuz if U.S. "Makes a Small Mistake", the Tower Magazine, July 29, 2016, http://www.thetower.org/3712-iranian-general-threatens-to-shut-down-straits-of-hormuz-if-u-s-makes-a-small-mistake/

6 Announcement from the Security Cooperation Agency of the US Army: http://www.dsca.mil/sites/default/files/mas/saudi_arabia_15-68.pdf.

7 Defense News. Retrieved 24 December 2014.

Figure 2.3 Vessels in the Saudi Navy

The Iranian Navy

The Iranian navy is perhaps the most important wing of the Iranian Army. The country's dependence on its oil exports means, from Iran's point of view, that its main route for oil (and other) exports, namely the Persian Gulf, must remain open to Iranian oil tankers and other merchant vessels.

The Iranian marine arm consists of two separate forces: the Navy, which is part of the Iranian army (The Islamic Republic of Iran Navy – IRIN), and the Revolutionary Guards Navy (IRGC). There is some overlap between the two in terms of areas of responsibility and action, but there are differences in their weapons, training and tactics of warfare.

IRIN is a conventional navy operating along the coast and out at sea, equipped with various kinds of vessels (including submarines) and aircraft. Its main area of responsibility is to provide a defense line in the Persian Gulf and the Gulf of Oman, but its activity as a marine attack force stretches to the Red Sea and northwards to the Mediterranean; to the Atlantic Ocean to the west; and to the east of the Indian Ocean and the Pacific Ocean, including visits by navy vessels to China. The navy's presence at such distances is a continuation of Iranian policy that promotes its presence far beyond the Persian Gulf. Some of the Iranian Navy's operational activity includes protection of Iranian ships against piracy in the west of the Indian Ocean (as an independent force, parallel to the Combined Marine Task Force – CMF). It should be noted that the Iranian Navy also carries out operations in the Caspian Sea.

The IRGC is responsible for protecting the Persian Gulf, and it operates from islands in the Straits of Hormuz and along the Iranian coast. The Revolutionary Guards Navy consists principally of about 1,500 small, fast vessels equipped with guided missiles and rockets to attack costal targets and large vessels, using a "hit and run" tactic of asymmetric warfare. The subject of naval mines is very developed

in Iranian warfare tactics. The Iranians, are using technologically advanced mines made locally or bought from China and Russia. Mining to close the straits and prevent sea traffic is supposed to be done, in case of need, by submarines and attack boats. Quite some time ago Iran announced that it intends to use the fleet to close the Straits of Hormuz to maritime traffic in the case of military hostilities with the USA (for further details, see the chapter devoted to the Iranian navy).

The Egyptian Navy

The Egyptian navy is considered to be the largest, most modern fleet in the Middle East and Africa. It operates in two arenas: the Mediterranean and the Red Sea. The Suez Canal, which links these two seas, allows vessels to pass from one arena to the other. Since the end of the 1970's, the task of the navy has changed. From possible warfare with Israel and Libya in the Mediterranean and the Gulf of Suez, its tasks have broadened to cover activity in the Red Sea, including patrols and protection of Egypt's coastal waters and Exclusive Economic Zones. In addition, over the years the importance of anti-submarine warfare has grown.

The internal political situation, Muslim extremism, and instability in neighboring countries (particularly Sudan) have also contributed in changes to the navy's tasks in the Red Sea. Other important factors influencing the change include the pirate attacks in the Red Sea and attacks on tourists on Red Sea beaches by extremist elements. After many years of stagnation, these led to a constant process of modernization and growth of the fleet. Since the start of the 1980's, old vessels, mostly made in Russia, have been replaced with vessels from China and western countries. In addition, a deal has been finalized to purchase ships from the United States, to strengthen the naval capabilities of the Egyptian army and to maintain its status as the largest and strongest Navy in the Middle East.

Although most of the Egyptian vessels are stationed in the Mediterranean (at its marine bases in Alexandria and Port Said), there have been significant reinforcements in two other important bases in the Red Sea (Aurdaqa and Safaga). Ships sailing from these bases carry out random checks (or based on intelligence) to locate weapons being smuggled on merchant or fishing vessels to Egyptian ports, or ships on their way to the Suez Canal. For example, in April 2013 a merchant ship sailing under the flag of Togo was stopped on entering Egyptian territorial waters in the Red Sea. The ship was found to be carrying a cargo of heavy weapons, which was confiscated in Safaga.

Figure 2.4 Vessels of the Egyptian navy

As part of the closer relations between Egypt and Saudi Arabia, the navies of the two countries have held joint training exercises in the Red Sea in order to increase their abilities to cooperate at strategic and maritime level "in order to lay the foundations for security and stability in the Middle East".[8] The growing closeness between Egypt and Saudi Arabia reach its height in the agreement signed in April 2016, in which the islands of Tiran and Snapir were transferred from Egypt to Saudi Arabia (in a move that met with opposition in the Egyptian Supreme Court).

The Egyptian navy includes the latest helicopter carriers, four submarines of the 209/1400 class, four Romeo submarines, 11 frigates, six corvettes, 25 landing craft of various kinds, 45 missile boats at least, eight anti-submarine ships, 23 minelayers, 9 tankers, 4 supply and assistance ships, and five training vessels. In addition the Coast Guard operates about 180 rapid patrol boats in the coastal waters and in the area of marine installations.

The Pakistani Navy

For many years, Pakistani policy gave the navy secondary importance compared to the land army and the air force. Although Pakistan, as coastal country located between Iran and India, should have had a large interest in maritime economy and strategy, the process of modernizing the navy only began in 2001. The change came

8 Egyptian–Saudi Maritime Maneuver Underway in Red Sea http://thecairopost.youm7.com/news/136750/news/egyptian–saudi–maritime–maneuver–underway–in–red–sea

following Pakistan's involvement in the War on Terror. The navy expanded its areas of operation, in both the national and international arenas, against terror threats at sea, drug smuggling, and the war on marine piracy, including participation in the UN Task Force against piracy in the Gulf of Aden and the Horn of Africa. Most vessels in the Pakistani navy are made locally or in China, although some of them were made in western countries, including the USA, England and France.

The Pakistani navy has 10 frigates, three minelayers, 13 missile boats, 10 auxiliary ships, 12 hovercraft, 17 coast guard ships, and 6 patrol boats. The navy's aircraft include ten anti-submarine planes, 7 marine patrol planes, 4 electronic warfare planes, 12 anti-submarine helicopters and about 35 Chinese attack planes model JF-17.

The Pakistani navy also operates three Augusta model B90 submarines, two Augusta model 70 submarines and three attack submarines for shallow water. According to local publications, eight model 20S submarines have been ordered from China, some to be built in China and some in Pakistan by 2028.[9] Declarations have also been made about a plan to build a nuclear submarine. However, it appears that the road to actual purchases is still long.[10]

Figure 2.5 Vessels of the Pakistani navy

9 http://thediplomat.com/2016/08/china-to-supply-pakistan-with-8-new-stealth-attack-submarines-by-2028.

10 http://quwa.org/2016/05/11/part-1-will-pakistan-now-seek-nuclear-submarines.

The American Fleet in the Indian Ocean, the Persian Gulf, and the Red Sea

Since the British retreat from "East of Suez" in the 1970's, the United States has provided the main guarantee of freedom of navigation and security in the Indian Ocean and its tributaries,. Three separate fleets of the American Navy are active in the Indian Ocean. Two of them – the Sixth Fleet and the Seventh Fleet – are also active in the Atlantic and the Pacific, respectively. Only the Fifth Fleet, stationed in Bahrein, is limited by its task definition to the south of the Middle East, the coasts of Pakistan, the Horn of Africa and the Indian Ocean. The naval activity is under the command of the US Naval Forces Central Command. The task of the Fifth Fleet consists of marine security operations and collaborations with friendly navies to strengthen their operational capability and to promote security and stability in the region.

The Fifth Fleet, stationed in Bahrein, usually consists of over twenty vessels, about 1,000 shore crew, and about 15,000 sailors, air crew and marines in a battle group of aircraft carriers, landing group, fighter aircraft and assistance units. The Fifth Fleet is ready for an immediate response to anything required in an emergency, including assistance to UN peace-keeping missions and war on pirates, help at times of natural disasters, and military missions in the event of local hostilities. It is important to note that the presence of the American navy in the area is conditional on the good will and readiness of the friendly host countries.

Overcoming the tension in Iran, the war in Yemen, arms smuggling through the Red Sea and Sudan, the concern regarding instability in Saudi Arabia and Egypt, and other political and military events, have led and continue to lead to reinforcement of the American Navy in the region by means of vessels from the Sixth Fleet which is stationed in the Mediterranean. The passage of American vessels through the Suez Canal for patrol purposes in the Red Sea is a routine matter.

Here are four examples of the activity of American vessels in the Red Sea, whether for routine patrols or for special missions:

1. In June 2010, 11 American ships and an Israeli missile boat sailed through the Suez Canal from the Mediterranean to the Red Sea when Iranian ships were intended to approach the Gaza coast. One day before the passage, the Egyptians permitted the passage of the Iranian ships.

2. On July 2013, two ships carrying marines on patrol in the Red Sea drew close to the Egyptian coast during the removal of the Egyptian President Mohamed Morsi.

3. In January 2015, the President of Yemen was captured by Shiite Houthi rebels. Two American ships carrying helicopters and marines (an amphibious assault ship and a dock landing ship) entered the Red Sea and were on alert to evacuate the American Embassy in the situation deteriorated.

4. In May 2016 a missile destroyer from the Sixth Fleet in the Mediterranean came through the Suez Canal on its way to the Red Sea for a routine patrol.

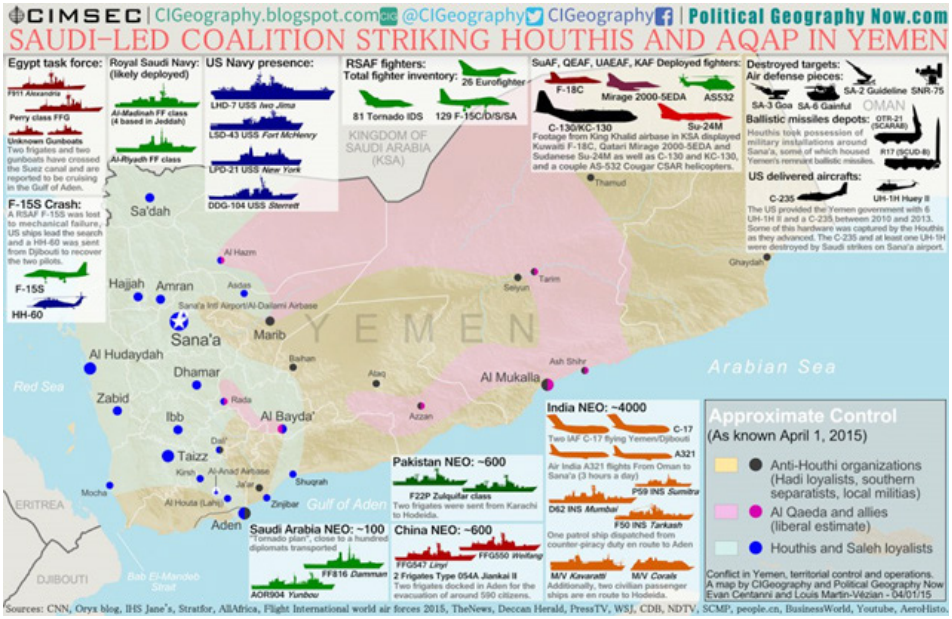


Figure 2.6 The Arab Coalition led by Saudi Arabia

The "Decisive Storm Operation" in the Seas around Yemen

The uprising of the Shiite Houthis against the Sunni regime in Yemen began in June 2004. At the end of 2009, Saudi Arabia imposed a marine blockage on the coast of northern Yemen as part of an escalation of the fighting against the rebels in the south of the Arabian Peninsula. Forces of the Saudi Navy carried out searches on vessels, and even took control of an Iranian merchant ship that was

shipping weapons to the rebels. In January 2011 a civil revolution began in Yemen (following the revolution in Tunisia, as part of the "Arab Spring"). Later, in May, a civil war broke out in the country. In September 2014, the Houthi rebels captured the capital. On 26th March 2015, a coalition of Arab and Muslim countries, led by Saudi Arabia, embarked on "Decisive Storm Operation", with the aim of driving the rebels back and restoring power to Sunni government.

The organized naval activity began on 28th March 2015, with the evacuation of Saudi, Arab and Western diplomats from the town of Aden, by vessels from the Saudi Arabian navy, due to fears of a Houthi takeover. On 3rd May the first ground force of the Saudi coalition landed in Aden. At the same time, the Saudi Navy placed a blockade on Yemeni ports. The purpose of the blockage was to prevent the rebels from obtaining reinforcements of weapons and men from Iran (activity that both the Iranians and the rebels denied).

Forces from the Emirates, Kuwait, Bahrain, Qatar and Jordan joined the Saudi Arabian forces. Egypt and Pakistan announced they would also join the campaign, and that they intended to supply fighter planes, naval forces, and if necessary ground forces as well. Four ships of the Egyptian navy entered the Red Sea sailing towards the Gulf of Aden. Their role in the operation was defined as "securing the strategic waters that control the southern entry to the Suez Canal".

The Egyptian vessels patrolled the Bab El Mandeb Straits, where they discovered the presence of vessels from the Iranian navy (a destroyer and a corvette), that arrived from the Gulf of Aden, where they had previously been engaged in the fight against piracy. Apparently warning shots were fired, and there was fear of a naval clash between the Iranian navy and coalition forces. The Saudi navy increased the range of its marine patrols in order to prevent the arrival of reinforcements and weapons to Yemeni ports. This activity was joined by the Pakistani navy, while the naval forces of Egypt, Saudi and the UAE were on operational alert on the western side of the Houthi forces in order to threaten their advance.

At the same time, the USA sent the aircraft carrier Roosevelt to join the five American vessels already in the region, in order to stop any Iranian vessel that might be carrying weapons to the rebels. Indeed, Iranian ships carrying supplies for the Houthis were forced to turn back to Iran when the United States threatened to open fire. Also two helicopter carriers manned by marines (USS Iwo Jima and USS Fort McHenry), which were engaged in routine activity in the Red Sea, were placed on alert to help in the operation. When the aircraft carriers joined the American forces, their presence was defined by the Pentagon thus: "To respond to

the deteriorating security situation...". This purpose was announced shortly after the Saudi announcement of the end of military activity and the start of contacts to find a political solution. In spite of the end of military activity, the Iranian flotilla remained in the area.

During October 2016 there were three incidents involving the firing of shore to sea missiles in the Bab El Mandeb Straits area by Houthi rebels. In the first case an Emirates ship was severely damaged, and in the other two (separate) incidents, missiles were fired at the American destroyer Mason, which returned fire and escaped from the incidents without damage.

Combined Maritime Forces – CMF, and marine activity against pirates in the Gulf of Aden

Since May 2008, at the request of the United Nations and according to the relevant decisions of the Security Council and international law, three task forces operating in the framework of the Combined Maritime Forces (CMF) have been active in the west of the Indian Ocean, as part of the international effort to combat marine piracy in the Gulf of Aden, the Horn of Africa and the Indian Ocean – the "Ocean Shield Campaign".

The CMF is a multinational task force set up to promote security, stability and economic prosperity in an area of 3.2 million square miles of international waters which involve a significant part of global maritime traffic. The main tasks of this force are to fight terrorism, to prevent marine piracy, to encourage and support international cooperation, and to ensure a safe marine environment.

The CMF consists of three task forces: CTF-150, in charge of marine security and fighting terror; CFT-151, in charge of combating marine piracy; and CTF-152, in charge of security in the Persian Gulf and of international cooperation.

31 countries participate in the multinational task force: Australia, the Emirates, Italy, the Seychelles, the United States, Bahrein, Belgium, Britain, Germany, Denmark, South Korea, Holland, the Philippines, Greece, Japan, Jorden, Quiet, Malysia, New Zeland, Norway, Singapore, Spain. Iraq, Saudia Arebia, Portugal, Pakistan, France Canada, Turkey, Thailand and Yemen.

Supreme command rests with the Commander of the Central Command of the American Navy, while commanders of the three task forces rotate among the participating countries. The General Command is located at the American naval base in Bahrein.

Other "independent" forces joining in the activity are fleets from China, India, Iran and Russia. The European Union operates the "EU Naval Force Atlanta", which includes Spain, Germany, Belgium, France, Holland, Norway, Portugal, Sweden, Italy and Estonia.

Shipping companies have also adopted various means to prevent attacks on their ships, from technological means to placing armed security teams on ships, all according to the guidelines in BMB4[11] (Best Management Practices for Protection against Somalia Based Piracy), a book of instructions and suggestions for captains and operators of merchant vessels who pass through areas at risk of pirate attacks.

According to the IMB (International Maritime Bureau),[12] in 2010 there were 124 attacks in the Gulf of Aden, the Red Sea and Somalia. In 2011 there were 198 attacks; in 2012 – 70 attacks; in 2013 – 10 attacks; in 2014 – 10 attacks; while in 2015 there were only three attacks. A combination of factors, including the combined efforts of the naval forces, the activities of shipping companies, preparing ships to resist attack following the BMP4 document, stationing armed protection teams on ships, political stabilization in Somalia, and the growing objections of the Somalian public to piracy in its territory have brought about a considerable reduction in attacks. However, it must be remembered that the Somali pirates still have the capability and the means to continue their activity, and every success, however isolated, could increase their motivation for more attacks (For further details, see the chapter devoted to Maritime Piracy and Armed Robbery at Sea).

Activity of the Chinese Navy – The String of Pearls

In recent years China has been taking aggressive action and reinforcing its military presence at key points in the South China Sea, by constructing harbors and landing strips on sandbanks and islands. This policy has led to diplomatic and legal disputes with other countries in the region. At the same time, actions are taking place in the Indian Ocean area to expand the Chinese naval presence through construction of the infrastructure for a civilian marine and Navy presence in countries friendly to China. This strategy became known as "The String of Pearls" and is part of the Maritime Silk Road initiative. The assessment is that the Chinese Navy and Air Force will set up and renovate 15 ports for civilian and military use, from Hong Kong to the Horn of Africa. The ports include Hong Kong, Sanya on the Chinese

11 Guidelines for Operators of Merchant Ships on Planning and Executing Passage through Areas at Risk of Pirate Attacks: http://eunavfor.eu/wp-content/uploads/2013/01/bmp4-low-res_sept_5_20111.pdf

12 World Shipping Bureau: https://www.icc-ccs.org/piracy-reporting-centre

island of Hainan, a group of 7 islands and sandbanks in the South China Sea, the port of Sihanoukville in Cambodia, Kra in Malaysia, Coco Island and Sittwe in Myanmar, Chittagong in Bangladesh, Hambantota in Sri Lanka, Marao in the Maldives, Gwadar in Pakistan, Al Ahdab in Iraq, Lamu in Kenya, and Port Sudan in Sudan. The assumption is that with the help of these ports, China will aggressively defend its naval routes, both local and regional, and the relevant choke points. It appears that China intends to redraw the geopolitical lines in South Asia, with the intention of restoring the days of its greatness and status by building ports, oil pipelines and transport infrastructure.

Figure 2.7 The String of Pearls of China and ports of the Chinese Navy in the Indian Ocean Arena

Each "pearl" in the string represents permanent Chinese presence, from the Chinese coast, along the sea routes in the South China Sea and the Indian Ocean in East Africa, through the Red Sea, all the way to the Mediterranean. The "string of pearls" is an initiative of the Chinese government, economic in nature, whose purpose is two-fold: to secure the import routes for agricultural, energy and quarrying goods (mostly from Africa and the Middle East) to China, and to secure China's export routes to Europe. Ports that are not on Chinese soil are built according to various models of economic cooperation with the countries in whose territory the port is located, such as BOT,[13] Joint Venture (JV), and others.

The activity of the Chinese navy in the Indian Ocean, the Gulf of Aden and the Red Sea, includes well known and documented passage through the Suez Canal to

13 Build – Operate – Transfer.

the Mediterranean. The Chinese authorities even openly declare their intention to continue submarine patrols on its maritime merchant routes, and their intention to set up ports and infrastructures to support the activity of the Chinese navy in the Horn of Africa in order to prevent pirate raids. The intended sale of eight Chinese made submarines to Pakistan will undoubtedly secure free and permanent access by the Chinese navy to Pakistani ports. The Seychelles and the Maldives are also candidates to serve as secondary bases and thus permit a permanent presence of Chinese vessels in the middle of the Indian Ocean. The establishment of the Chinese military base in the port of Obock in Djibouti is more or less a reality.

Even if there are disagreements on the question of whether the "String of Pearls" strategy is a purely economic move or whether it derives from a wish to acquire areas of military influence, as Professor James Holmes said: "Just because China has not yet built bases in the Indian Ocean, that doesn't mean it won't build them in future".[14]

Conclusion

This presentation of changes in the naval strategy of various countries, plus the survey of the growing tendency in those countries to adapt their navies to the 21st century by acquiring modern vessels and the process of renewal and growing strength, leads to the conclusion that there is a naval arms race in Asia.

India has intended to implement its marine strategy for many years and to maintain its status as the leading country in the Indian Ocean. The expansion of the Indian navy to the status of a long distance Blue Water Navy, equipped with aircraft carriers and the latest submarines, will help it to achieve its ambition, although it could well encounter opposition from the aggressive Chinese navy, which is eager to create facts in the Indian Ocean and along the African coast, as it did in the South China Sea.

Nor must we overlook the development of the Pakistani navy, after many years of neglect. Now, when it is clear to the Pakistani authorities that a country with a long coastline and a strategic position needs a strong, modern navy, we can assume that it will continue to respond to Chinese proposals to balance its capabilities in the northern Indian Ocean against other players in the arena.

14 China Could Still Build 'String of Pearls' http://thediplomat.com/2014/11/china-could-still-build-string-of-pearls

Since China has upgraded its activity in the South China Sea and the Indian Ocean (as well as in the East China Sea), countries along the coasts of these seas have changed their marine strategy and they are accelerating the rate of building and renewing their fleets. These changes signify a marine arms race in South Asia and South East Asia.

China, which for generations adopted a land based strategy, now understands the urgent need – as it becomes one of the world's leading importers and exporters – to nurture its marine trading routes and has adopted the "string of pearls" strategy of setting up bases and ports along its central shipping routes, and thereby to secure its imports of energy, quarried materials and food from the Persian Gulf and from Africa, and its exports to Europe, as well as to improve its global geopolitical status.

Iran's intention is to expand its influence in the countries of Arabia and on their shipping routes by strengthening is naval military presence, in addition to the political and religious actions it carries out. The commander of the Iranian Navy, Admiral Sayyari, announced that the Iranian Navy maintains a presence in the north Indian Ocean and in the Gulf of Aden, and Iran intends to continue this presence on a permanent basis. Indeed, Iran has military naval links and activity with Sudan, Somalia and Eritrea. The presence of the Iranian fleet in the Horn of Africa and in the Persian Gulf and its activities against piracy, as well as its involvement in the war in Yemen, have a significant effect on the nature of the Egyptian and Saudi Arabia presences in the region, and on the intensity of this presence. The shared concern in the face of the Iranian moves have led to increasing cooperation between Egypt and Saudi Arabia, in the attempt to disrupt Iran's status and frustrate its attempts to take control of the approaches to the Red Sea.

The political relations between Saudi Arabia and Egypt are improving in view of their shared mission of preventing Iran becoming stronger in the Red Sea. The joint maneuvers, policy coordination, and the agreement regarding the return of the islands of Tiran and Snapir in the approach to the Gulf of Eilat in April 2016, are evidence of the concerns of both parties and their attempts to change the situation, or at least to block Iranian advances. The Egyptian purchase of two helicopter carriers, and its amphibious operations capabilities, give it the possibility of locating "two naval bases" in the Mediterranean or in the Red Sea or in the Arabian Sea, depending on developments and the nature of the required response. There is no doubt that such activity represents a significant change in Egyptian policy regarding the dispatch of military forces to regions of interest, in view of its growing ties with Saudi Arabia and moderate Sunni Muslim countries.

Piracy in the Gulf of Aden and Somalia has been almost entirely wiped out, thanks to military activity by more than 30 countries and proper preparations by the shipping sector. Aerial patrols and concentrated activity of vessels and control-taking forces have contributed to international cooperation and the acquisition of operational experience by the fleets involved in the activity.

The fact that the Red Sea is a route for smuggling weapons, usually originating in Iran, to Palestinian terror groups, Hezbollah and the Houthi rebels, adds a dimension of military activity, with the aim of finding and stopping vessels involved in the smuggling. These ships usually arrive at Port Sudan. From there the weapons are taken by land to Egypt and the Sinai Peninsula. A number of countries are involved in the efforts to stop this smuggling.

To sum up, it appears that the two main events in terms of geopolitical and geostrategic influence on the situation in the Indian Ocean and its tributaries are the frictions in the Persian Gulf between the Iranian Revolutionary Guards Navy and the navies of America and its allies, and the Chinese "string of pearls" strategy. For many reasons, it is possible that these two conflicts could expand to other marine regions, mainly around the Horn of Africa and the Red Sea.

Chapter 3: Israel and the Eastern Mediterranean

Ehud Eiran and Aviad Rubin

General

The shockwaves of the events of the Arab Spring, which began at the end of 2010, continue to affect the countries of the Eastern Mediterranean and the region's maritime environment. Especially prominent are the effects of the civil war in Syria. Although it lacks a significant maritime dimension, various consequences of the war in Syria have significantly affected the region's maritime environment, especially when it comes to the Russian maritime presence in the region, including use of sea-based weapons on the Syrian coast, and the beginnings of an American response to this. At the same time, the war in Syria and instability in Iraq continue to push waves of refugees into Turkey, who continue from there to Greece via the maritime border between the two countries. More broadly, the waves of refugees and migrants from the southern and Eastern Mediterranean, from Syria and Libya,[1] continue to undermine political stability in the European Union, and contributed to the U.K.'s decision to leave the EU. European attempts to create a coordinated response to the movement of refugees, especially the agreement with Turkey, have partially begun to bring about a certain decrease, but have not stopped the flow of refugees.

In Egypt, the el-Sisi regime, which came to power in the wake of the Arab Spring, has not yet succeeded in becoming economically stable, despite completing a significant maritime project (the expansion of the Suez canal), and discovering large gas deposits in the off-shore Zohr field.

In addition, governance has weakened in the Mediterranean region, although fears that the growth of ISIS in Libya and Sinai would affect Mediterranean sea lanes have not materialized at present.

The Israeli-Turkish agreement to improve relations between the two countries, which was approved by Israel and Turkey in July and August 2016 respectively, is also expected to affect the maritime environment. Meanwhile, basic trends that affect the maritime environment endure, including the continued naval buildup of the strongest countries in the region, namely Turkey, Israel and Egypt (and in a broader scope, Iran) and the worsening socio-economic situation in Gaza, which

1 Many of the migrants through Libya come from Africa (and continue on to Europe) due to the weakness of the Libyan government.

contributes to the discussion within Israel on the construction of a Palestinian port in Gaza.[2] Israel and Lebanon have not yet resolved their dispute regarding the marking of the maritime border, but this has not deteriorated into a military confrontation. Changes to the global system are also expected to affect the Mediterranean, though not in the immediate term. One prominent challenge is that posed by China to the system of international maritime norms, in completely ignoring the decision of the International Court in The Hague regarding the conflict between China and the Philippines over sovereignty in the South China Sea.

The involvement of international forces

Russia and the United States – Governmental instability in some of the Arab countries, which began with the events of the Arab Spring at the end of 2010, continues to influence countries in the region and the regional maritime environment. The civil war in Syria that began in 2011 is still in full force, and Syria's territory is divided between government forces, ISIS forces, various Kurdish militias, and other rebel forces. Since fall 2015, Russian ground and air forces have been operating in Syria at the official invitation of the Assad regime. Russian intervention has helped the current regime reconquer various areas such as the cities of Palmyra and Aleppo. In addition to ground operations in Syria, the Russians have permanently stationed between 10 and 15 ships in the Eastern Mediterranean.[3] Since May 2015, the Russian naval force has been organized as the Fifth Eskadra, named after the Soviet naval force that operated in this area during the Cold War[4] and was formally disbanded in 1992.[5] As in the days of the Cold War, the main objective of this force is apparently to make its presence felt and to signal to regional and global players (especially the U.S.) that Russia is a powerful player with capabilities that must be taken into consideration. Western officials expressed concerns about the buildup of Russian capabilities, and warned that it will create areas in some parts of the

2 On the other hand, there are those in the Palestinian Authority who oppose the establishment of a port, lest it strengthen Hamas.

3 Tamer El Ghobashi, "U.S. Carrier's Moves Send Message to Russia", *Wall Street Journal*, 8 June, 2016, See: http://www.wsj.com/articles/u-s-carriers-moves-send-message-to-russia-1465419667 (Accessed August 14, 2016).

4 Gordon McCormick, The Soviet Presence in the Mediterranean, Rand Paper, 1987, see: https://www.rand.org/content/dam/rand/pubs/papers/2008/P7388.pdf (accessed August 14, 2016).

5 The Voice of Russia, "Russia returns to the Mediterranean: Fifth Soviet Navy Squadron is Back?", 26 February, 2013. See: http://sputniknews.com/voiceofrussia/2013_02_26/Russia-returns-to-the-Mediterranean-Fifth-Soviet-Navy-Squadron-is-back/ (accessed 14 August, 2016).

Eastern Mediterranean in which the Russians will be able to prevent activities by other militaries (anti-access/area denial).[6] The stationing of these vessels is part of the broader trend of increased Russian maritime presence in the Mediterranean (as well as in the Black Sea), which includes increasing the number of port calls in countries such as Spain, Greece and Malta, as well as a docking agreement with Cyprus that was signed in 2015.[7]

The stationing of these forces aids the Russian war effort in Syria and also enables Moscow to demonstrate its military capabilities. For example, in December 2015, a Russian submarine, Rostov-on-Don, for the first time fired cruise missiles at targets in the Raqqa Governorate.[8] The Americans responded with a similar signal when, at short notice, they sent two aircraft carrier groups (USS Harry S. Truman and USS Dwight D. Eisenhower) to a tour of the Eastern Mediterranean in June 2016. Anonymous officials at the American Department of Defense explicitly stated that this action was intended to demonstrate American capabilities to the Russians.[9] The tension between the Russian and American navies in the region increased when, in April and June 2016, they traded mutual accusations over dangerously close maneuvers by aircraft and vessels of the two navies;[10] the commander of the Sixth Fleet, Admiral Foggo, accused the Russian vessels of "unsafe and unprofessional" behavior.[11] In August 2016, cruise missiles were again fired from Russian vessels towards targets in Syria, in a move that was seen as a demonstration of Russian power in the area in response to the American moves.[12]

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6 http://www.jpost.com/Middle-East/Top-NATO-general-Russia-building-anti-access-bubble-over-Syria-419393

7 Olga Razumovskaya, "Cyprus Signs Deal to Let Russian Navy Ships Stop at its Ports", Wall Street Journal, 25 February 2015. See: http://www.wsj.com/articles/putin-highlights-closer-russia-cyprus-ties-1424882012 (Accessed August 14, 2016).

8 Nicholas de Larrinaga, "Russian Submarine Fires Cruise Missiles into Syria," Jane's Defence Weekly, 10 December 2015. See: http://www.janes.com/article/56544/russian-submarine-fires-cruise-missiles-into-syria (accessed 14 August, 2016).

9 Tamer El Ghobashi, "U.S. Carrier's Moves Send Message to Russia", *Wall Street Journal*, 8 June, 2016, See: http://www.wsj.com/articles/u-s-carriers-moves-send-message-to-russia-1465419667 (Accessed August 14, 2016).

10 Dmitry Solovyov and Idrees Ali, "Russia, United States Blame each other for Maritime Incident", 28 June, 2016. See: http://www.reuters.com/article/us-russia-usa-navy-idUSKCN0ZE1Q8 (Accessed 23 August, 2016).

11 http://nationalinterest.org/blog/the-buzz/the-us-navy-russia-heading-towards-crisis-the-mediterranean-16834

12 Andrew E. Kramer and Anne Bernard, "Russia Asserts Its Military Might in Syria", *the New York Times*, 19 August, 2016. See: http://www.nytimes.com/2016/08/20/world/middleeast/russia-syria-mediterranean-missiles.html?_r=0 (accessed August 21, 2016).

The Russians responded to the presence of the American aircraft carriers by sending the Russian aircraft carrier Admiral Kuznetsov to the Eastern Mediterranean and the Syrian coast in October 2016.[13] According to the Russian statement, the official purpose was operations against ISIS, but the background to the decision is evidently the confrontation with the United States over maritime dominance in the region. Israel made significant efforts to create channels of communication with the Russian forces operating in the region, in order not to get caught up in an unnecessary confrontation with them. While according to the media, the efforts focused on Russian air operations, similar efforts are presumably being made with regard to maritime operations, in order to avoid mishaps. The massive Russian presence, inter alia as part of an axis that includes Syria and Hezbollah, which are hostile to Israel, creates limitations on Israel's freedom of action in the Eastern Mediterranean, especially with respect to exposure to advanced detection systems that the Russians have brought to the area, and limitations on commando operations and the movement of underwater vessels.

Chinese involvement in the region

In April 2016, the Chinese shipping company COSCO acquired the Port of Piraeus, after leasing and operating it since 2009. The Chinese plan is to turn Piraeus into the busiest port in the Mediterranean.[14] Chinese entities are considering to compete in a similar tender for the privatization of the Port of Thessaloniki. The acquisition of the Port of Piraeus signifies the deepening of Chinese involvement in the region, as part of the completion of the new Maritime Silk Road ("One Belt, One Road"), which expresses the Chinese view that the Mediterranean is an important corridor on the path to European markets. Chinese penetration of the region is also being felt in Israel, with the expansion of Israeli ports, the boring of the Carmel Tunnels, and the construction of the train line to Eilat by Chinese companies. As of today, there is a gap between Chinese economic interests and the actual presence of the Chinese fleet in the Mediterranean basin. Because of the region's instability, it appears that protecting Chinese economic interests will require the increasing presence of the Chinese navy in the Mediterranean basin.[15] The first evidence of this is the announcement of a new Chinese navy base in

13 http://tass.ru/en/defense/886110

14 Glass, David, "Piraeus Aims For Mediterranean Port Top Spot" Seatrade (February 16, 2014). See: http://www.seatrade-maritime.com/news/asia/piraeus-aims-for-meditteranean-port-top-spot.html (Accessed August 22, 2016).

15 Sellier, Elodie, "China's Mediterranean Odyssey," *The Diplomat* (April 19, 2016). See: http://thediplomat.com/2016/04/chinas-mediterranean-odyssey (accessed August 23, 2016).

Djibouti at the horn of Africa, which was reported in May 2016, in a step that will enable the Chinese to ensure the movement of its vessels in the Red Sea, Gulf of Aden and Suez Canal, and make it easier to move maritime military platforms to the Mediterranean.[16] Additional evidence of China's increasing interest in the region is the well-publicized visit of a Chinese admiral to Syria in August 2016, with the purpose of strengthening connections with the Assad regime and expressing support for it against the backdrop of the ongoing civil war in Syria.[17]

Refugees

The Eastern Mediterranean continues to serve as one of the two sea routes for Middle Eastern refugees to Southern Europe, alongside the route that passes through the central Mediterranean, between Libya and Italy.

Between January and mid-August 2016, 266,524 refugees reached the countries of Southern Europe. 162,273 of them came from Turkey and Egypt to Greece. Another 101,775 came from Libya and Egypt to Italy. Around 40% of the refugees fled the wars in Iraq and Syria. In the first three months of 2016, the number of refugees surpassed that of the previous year, but starting in April 2016 the trend reversed and it appears that in 2016 the number of refugees will be fewer than the million refugees who crossed the Mediterranean in 2015. This is apparently due to the refugee agreement signed in March 2016 between Turkey and the European Union. In addition, 3,151 of the migrants crossing the Eastern Mediterranean were listed as missing or dead between January and August 2016.[18] NATO has also gotten involved in the issue, and in February 2016 began operating sea vessels and aircraft in the Aegean Sea in an attempt to stop the flow of refugees,[19] despite the clear dissatisfaction of some NATO members, including Turkey.[20]

The movement of refugees by sea towards EU countries has significant implications for all of the players involved, and also indirectly for Israel. The increasing dependence on Turkish regulation on the issue of migration has improved Turkey's bargaining power vis-à-vis the EU, and in March 2016 led to the agreement

16 http://thediplomat.com/2016/04/why-chinas-djibouti-presence-matters/

17 http://www.telegraph.co.uk/news/2016/08/18/china-steps-up-military-cooperation-with-assad-as-top-admiral-vi/

18 See: http://data.unhcr.org/mediterranean/regional.php (accessed August 21, 2016).

19 https://www.theguardian.com/world/2016/feb/11/nato-tasks-naval-patrol-with-combatting-people-smuggling-in-the-mediterranean

20 http://www.nytimes.com/2016/06/17/world/europe/shifting-attention-to-mediterranean-nato-fights-internal-dissent.html?_r=0

according to which Turkey will stop the flow of refugees to Europe and will agree to refugees being returned to its territory in return for significant sums of money that the European Union will transfer to Turkey, and a tolerant policy towards the Turkish regime's conduct. The agreement with Turkey was reached after a series of attempts, which turned out to be ineffective, to consolidate and implement a coordinated European plan (by FRONTEX[21]) in order to prevent migration by sea. These failures led to serious economic and political crises in the initial destination countries, Greece and Italy.

A significant decrease in the number of refugees entering Europe through Greece in 2016 from the previous year is an indication of the effectiveness of EU-Turkey agreement,[22] and even led Germany's leader Merkel to propose working towards similar agreements with the gateway migration countries in North Africa.[23] At the same time, the flow of refugees from Libya to Italy is constantly increasing, and reports state that some 10,000 migrants reached Italy by sea during four days in June 2016 alone,[24] in addition to a widespread rescue operation by Italian navy forces of some 6,500 migrants from African countries via Libya to the Italian coast, in a single night at the end of August 2016.[25]

It is important to note the demographic differences between the migrant populations. The refugees arriving in the EU via the Turkey-Greece route are mainly refugees from Syria made up of entire families, including women and children, while the migrants coming from Libya to Italy are mainly migrants from sub-Saharan Africa characterized by demographic homogeneity, mainly young men.

The refugees already in Europe, and those continuing to arrive, add to the EU's instability. The difficulty of controlling the population movement and ensuring basic living conditions for the refugees makes Europe more vulnerable to terrorist attacks and increases the popularity of right-wing movements that oppose immigration, open borders and the continued existence of the European Union as

21 FRONTEX is the European agency of border and coast guards.

22 BBC News, 'Migrant cCisis: EU–Turkey Deal is 'Working'. April 24, 2016. See: http://www.bbc.com/news/world–europe–36121083 (accessed August 23, 2016).

23 Joe Watts, "Angela Merkel Calls for 'one in, one out' Immigration Deals with North Africa to Stem Refugee Crisis", *The Independent*, August 23, 2016. See:http://www.independent.co.uk/news/uk/politics/angela–merkel–refugees–north–africa–immigration–crisis–turkey–deal–a7205206.html (accessed August 23, 2016).

24 http://www.dailymail.co.uk/news/article–3662601/10–000–migrants–cross–North–Africa–Italy–just–FOUR–DAYS–revealed–6–ordered–return–home–year–actually–went–back.html

25 http://www.bbc.com/news/world–europe–37216881

a political framework.[26] The refugee issue and sovereign control of borders were major issues in the British decision in June 2016 to leave the European Union.[27]

Regional powers

Turkey: Turkey's actions in the region in the second half of 2016 were characterized by striving to reduce hostility with other players in the region, including the refugee agreement with Europe, reconciliation agreements with Israel, and a reconciliation agreement with Russia, which included a visit by Turkish President Erdogan to Russia. The Turkish agreement with Israel included Israeli consent to Turkey providing goods to the Gaza Strip through the Port of Ashdod, which would lead to considerable Turkish civilian ship traffic in the area. However, Israel refused Turkey's demand to lift the blockade of Gaza. The failed coup against the Erdogan regime in July 2016 led to broad actions against internal challenges to the regime, and these are expected to lead to a relative decrease in Turkey's involvement in the region in the short term, apart from the considerable Russian-Turkish cooperation on the fighting in Syria.

In June 2016, President Erdogan announced that starting in 2021, after completing the construction of a 27,000-ton amphibious assault ship with the ability to carry F15 warplanes with vertical takeoff capability, which is currently being carried out at Turkish shipyards, Turkey will be capable of independently constructing full-size aircraft carriers.[28] Simultaneously, the Turkish defense industries are strengthening ties with the Pakistani fleet as part of two large-scale projects. In August 2016 a large 15,600-ton refueling ship was launched, after being built with Turkish planning and supervision. In June, the Turkish industries received a project to upgrade Pakistani Agosta B90 attack submarines. Finally, in April 2016, Turkey opened a permanent base in Qatar, which includes sea, air and ground systems. This strengthens the strategic alliance with the oil emirate, and provides Turkey with quick response capability in the Persian Gulf and the Horn of Africa.[29]

Egypt: Alongside the economic and political challenges facing the el-Sisi regime in Egypt, the Egyptian navy is continuing its buildup and maintaining open channels

26 http://www.nytimes.com/interactive/2016/05/22/world/europe/europe-right-wing-austria-hungary.html?_r=0 (accessed August 23 2016).

27 http://www.migrationobservatory.ox.ac.uk/projects/brexit

28 https://www.rt.com/news/347350-turkey-aircraft-carrier-erdogan; http://www.al-monitor.com/pulse/originals/2015/05/turkish-navy-aims-high-for-2033-become-global-force.html

29 http://www.reuters.com/article/us-qatar-turkey-military-idUSKCN0XP2IT

with Russia and with NATO. In June 2016, Egypt received its first French-produced Mistral-class helicopter carrier/amphibious assault ship. In August 2016, a Russian 32-R missile corvette that Russia donated to the Egyptian navy began active service. Egypt also announced that it is equipped with Russian Kamov-52 naval attack helicopters, which will serve on the deck of the Mistrals.[30] In Germany, construction continues on two submarines intended for the Egyptian navy. This latest wave of buildup signals moving away from depending on American naval platforms, although the American administration did approve the sale of Harpoon Block II missiles (UGM 84L) to the Egyptian navy this year.

In August 2016, the Egyptian navy conducted a joint exercise with a NATO force as part of a NATO visit to Egyptian navy bases in the Mediterranean.[31] Egypt is also continuing its efforts to counterbalance the Turkish buildup in the region by creating an axis of cooperation with Greece and Cyprus. In an interview in August 2016, the Egyptian President announced a planned three-way summit between the countries in order to deepen the cooperation between them.[32]

All of the recent developments – the expansion of the Suez Canal, the large-scale naval buildup, the discovery of the natural gas field off the coast of Egypt (Zohr), the active participation in the sea blockade as part of the civil war in Yemen, and increased involvement in preventing maritime drug and migrant smuggling – demonstrate that the maritime component of Egypt's national security doctrine has become more dominant. Tensions with Iran, Turkey and political Islamist groups, including Hamas in Gaza and ISIS in Sinai, also contribute to the continued security coordination and cooperation between Egypt and Israel, including in the maritime arena.

The Palestinians: The Gaza coast continues to be a source of risks and challenges for Israel, but also allows for a series of solutions to relieve the plight of Gaza's residents. The risks include Hamas's efforts to develop a highly capable marine and submarine force that could raid Israel by sea. The success of such a force, in the summer of 2014 during Operation Protective Edge, in penetrating from Gaza onto the Zikim beach and attaching an explosive device to an Israeli Merkava tank

30 http://www.defensenews.com/story/defense/naval/naval-aviation/2016/01/01/russia-supply-egyptian-navy-with-46-ka-52k-helicopters/78182410/

31 http://english.ahram.org.eg/NewsContent/1/64/238917/Egypt/Politics-/Egypt-conducts-joint-military-drill-with-NATO-nava.aspx

32 http://www.ansamed.info/ansamed/en/news/nations/cyprus/2016/08/22/egypts-foreign-relations-not-based-on-dependency-sisi-says_1625ac2d-e30e-42bd-8102-f1dd526d0399.html

illustrated for Hamas the potential of this military channel. In addition, the Israeli navy must cope with three main challenges with Gaza: the continuation of the naval blockade of Gaza; limiting the movement of fishing boats to a distance of three miles in order to prevent smuggling by sea; and preventing attacks on Israeli vessels and/or coastal targets.

On the other hand, in light of the difficult humanitarian situation in the Gaza Strip, a number of solutions have been proposed that have the potential to improve the situation of Gaza's residents, and perhaps thus reduce the risk of another round of fighting in the conflict between Hamas and Israel. When it comes to infrastructure, Israel is currently preventing the Palestinians from developing the Gaza Marine gas field off the coast of Gaza, and even refusing to sign a long-term agreement with Gaza on the sale of natural gas. An energy source such as natural gas is essential for the Palestinians in order to develop infrastructure to provide electricity and desalinate water. Recent efforts by the European Union have provided the funding necessary for such projects, but their implementation depends on Israeli policy. In addition, the Israeli defense establishment recently discussed the possibility of constructing a civilian port in Gaza, on the coast or on an artificial island close to the coast. While there are those in the army, both in the navy and military intelligence, as well as in the Ministry of Transport headed by Transportation Minister Yisrael Katz, who support the idea as a way to ease pressure in Gaza, the previous defense minister and the current one oppose the plan, mainly because a seaport is an important symbol of sovereignty. The agreement signed in July between Turkey and Israel indirectly affects the Gaza issue in that it allows Turkey to provide Gaza with humanitarian aid via Israeli ports. However, this does not currently lead to significant relief for Gaza.

Conclusion

The shockwaves of the Arab Spring continue to affect the maritime military environment of the Eastern Mediterranean. The two major expressions of this are the Russian penetration of the region and the hesitant American response, and the wave of refugees (a large portion of them fleeing the wars in Syria and Iraq) who are trying to reach Greece via Turkey.

Certain characteristics indicate an increase in international activity in the Eastern Mediterranean. One that stands out is the first-of-its-kind firing of cruise missiles from a Russian submarine towards targets in Syria, and the unusual, though brief, stationing of two sets of American aircraft carriers in the region. According to some experts, the Russian naval deployment to the Syrian coast created a kind of

"bubble" around Syria and its territorial waters, in which the Russians can prevent military activities by anyone else. NATO has also begun limited operations in the Aegean Sea in an effort to assist Greece in monitoring the movement of refugees from Turkey. In the background, China's slow buildup in the region continues, though at present it is limited to civilian aspects of constructing, acquiring and operating ports, including Israeli ports.

Alongside the increased activities of the superpowers in the region, the buildup of the strongest regional navies continues. Turkey continues to construct a light aircraft carrier, and its president has even declared that in the future his country will be able to construct a "full" aircraft carrier. For the first time since the collapse of the Ottoman Empire, the Turks have established a military base in the region, located in Qatar. Egypt continues to build up its naval force. This year it received a *Mistral*-class helicopter carrier/amphibious assault ship from France. Egypt has also made use of a Russian corvette that it received as a gift from Moscow. Meanwhile, construction of two diesel submarines for Egypt continues, in addition to the American Congress's approval of arming the submarines with Harpoon Block II missiles.

In Israel's immediate environment, the internal discussion continues on the possibility of opening a civilian port in Gaza, although some in the Palestinian Authority oppose this because it could, in their opinion, aid Hamas in Gaza.

In the final analysis, despite the intense maritime activity, especially by Russia but also by the U.S., and despite the buildup of the Israeli, Egyptian and Turkish navies, the maritime environment remains generally stable, though more complex and crowded. This stability is the result of the absence of direct competition between the main players in the region, and even some overlapping interests. The Turkish effort to reconcile with Israel and with Russia certainly contributes to this trend. At the same time, in a reality where multiple players are armed with advanced weaponry, along with existing but latent tensions (U.S.-Russia, Turkey-Cyprus, Israel-Hezbollah), any exacerbation of this tension would require deeper coordination in order to prevent unnecessary mishaps or even a direct conflict between various sides.

Chapter 4: A Grand Maritime Strategy for Israel

Oded Gur Lavi

General

The State of Israel does not have a grand strategy, let alone a grand maritime strategy. The absence of such a strategy leads to ad hoc policy and decision-making that does not look towards the future, a policy that may create significant disparities in Israeli security, economy and sustainability in the coming decades.

For the past few decades, there has been an effort to formulate and update Israel's defense doctrine. One of the most comprehensive documents written on the subject, under the leadership of former minister Dan Meridor (in two rounds, in 1986[1] and again in 2007), was presented to defense figures and to the Israeli Government, but not officially approved as Israel's strategy document.[2] Over the past two years, there has been an additional non-institutional process led by Professor Uzi Arad, former National Security Advisor. The process's purpose is to prepare an up-to-date overall strategy document. Many entities are partners in this process, but it has not yet developed into an overall national strategy that is accepted by all of these bodies.[3]

Over the years, defense strategy documents have been written by the various branches of the military. The perspective of these documents was topical and focused on building up military force and the budget required for this. Out of all such documents, especially noteworthy is the IDF Strategy Document[4] written by Chief of Staff Gadi Eizenkot. Nonetheless, because these strategy documents were not written within an accepted and agreed-upon context at the national level, it is difficult to direct these topical strategies towards a national grand strategy.

1 Then Member of Knesset Dan Meridor, who headed the Knesset's Defense Doctrine Committee, produced a 30-page document on the subject in 1986 and submitted it to Dan Shomron. Most of the document remains classified.

2 "The Need to Reformulate Israel's National Security Doctrine," Alex Mintz and Shaul Shay, Herzliya Conference on formulating Israel's national security doctrine [in Hebrew]. http://www.herzliyaconference.org/_Uploads/dbsAttachedFiles/Tbitachon1.pdf

3 "Overall Strategy for the State of Israel," Samuel Neaman Institute [in Hebrew] http://www.neaman.org.il/Neaman2011/Templates/ShowPage.asp?DBID=1&TMID=580&LNGID=2&FID=964&IID=1361

4 The IDF Strategy document, IDF website, https://www.idfblog.com/s/Desktop/IDF%20Strategy.pdf

It is important to emphasize that there is a substantial difference between a maritime defense strategy and a grand maritime strategy. The latter term includes the former, as well as civilian issues such as trade, ports, protecting the marine environment, marine agriculture, mining, cruises and recreation, history, heritage, and more.

One of the primary challenges in formulating a maritime strategy is deciding what is included in this grand strategy, and what remains the responsibility of the various government ministries and regulatory bodies.

World overview

Assessing the maritime strategy of other countries demonstrates a range of approaches that result from the differing geopolitical, military, and economic conditions of the different countries. In addition, the past decade has seen a wave of publications on broad, comprehensive maritime strategies, or strategies that have been updated due to the accelerating process of globalization, the growth in the volume of international trade, and technological advances that enable the exploitation of economic marine resources that were not previously available. All of these factors influence the world economy and foreign relations, and lead to changes in the maritime environment that require creating relevant strategy and policy.

In 2009, the U.S., as the leading superpower, published a document on its maritime-military strategy, and another document in 2015.[5] Both documents place an emphasis on military issues, and they focus on the power structure and range of deployment necessary in order to secure sea lanes and American national interests. Other U.S. government ministries have also published various policy documents on additional subjects related to maritime issues.

Portugal has published[6] a maritime strategy document that encompasses many topics in addition to military strategy, because Portugal – as a member of both the European Union and NATO – can "afford" to carry out long-term planning, to shorten this section of its strategy, and to expand on the topic of trade and economy as central components of maritime strategy.

5 US navy website: http://www.navy.mil/local/maritime/

6 Directorate–General for Maritime Policy of the Ministry of Agriculture and the Sea; National Ocean Strategy 2013–2020; http://www.dgpm.mam.gov.pt/Documents/ENM_Final_EN_V2.pdf

The Netherlands has also published[7] a comprehensive document that encompasses various maritime issues. The document emphasizes the cooperation necessary among various fields in order to create synergy to assist in leveraging the Dutch economy while maintaining military response capability and Dutch interests even in areas that are geographically distant from the Netherlands (This can be seen as a remnant of the Netherlands' colonial history).

In France too, a comprehensive document ("The Blue Book")[8] on France's grand maritime strategy has been published. This document places a strong emphasis on freedom of navigation and maintaining French interests outside of Europe. In addition, the French document emphasizes strengthening trade and economic influence while utilizing the exclusive economic zone (EEZ) of each of France's maritime regions. France sees itself as connecting between oceans and seas (the Mediterranean Sea and the Atlantic Ocean) and as an influential player in these arenas, and considers planning the buildup of naval power and soft power as part of its maritime strategy.

China has developed a different approach to its maritime strategy, focusing on military strategy. China's approach is a preventative strategy: creating influence by preventing the capabilities of others. There is no doubt that this is a more aggressive approach that does not tend to rely on "soft power." Such an approach requires China to go out into the oceans and create a blue-water navy. In light of this strategy, the Chinese navy must transform from a navy whose role is to protect China and its coastal waters, to one with the capability to influence China's interests in all arenas including in the oceans, in the China Sea and in critical passages such as the Andaman Sea region, the Red Sea and the Port of Djibouti.

By examining the various strategies, we can see that there are essential elements that appear in each country's maritime strategy, but the relative weight of the different elements changes in accordance with the country's challenges, geographical location, standing, and geopolitical aspirations, as can be expected in this kind of long-term thinking.

7 The Dutch Maritime Strategy 2015 – 2025; A comprehensive framework for the government-wide policy for the maritime cluster. https://www.government.nl/binaries/government/documents/reports/2015/07/07/the-dutch-maritime-strategy-2015-2025/150604-maritieme-strategie-uk-lr-2.pdf

8 National Strategy for the Security of Maritime Areas http://www.gouvernement.fr/sites/default/files/contenu/piece-jointe/2016/01/strategie_nationale_de_surete_des_espaces_maritimes_en_national_strategy_for_the_security_of_maritime_areas.pdf

Finding an appropriate model for developing Israel's grand maritime strategy

The Israeli model must deal with many challenges, some of them general and some of them unique to Israel's geopolitical environment. Some of these challenges are internal, while others are external.

The internal challenges include Israel's demography and the distribution of its population along the coast; the lively public debate and involvement in issues related to the maritime ecological environment; the scarcity of land in general, and along the waterfront in particular; the issue of cultural and heritage sites; and the geographical location of energy and gas fields.

The external challenges include of course the maritime element as part of the overall threat to Israel, including the shared maritime border with enemy entities (Lebanon and Hezbollah in the North and Hamas in the South); the international legal environment (Israel is not a signatory to the Convention on the Law of the Sea, although it has declared that it sees itself as committed to its principles.[9] In addition, the Convention has customary significance that is binding upon Israel in any case); as well as the environmental challenges resulting from Israel's location at the closed eastern end of the Mediterranean, in a region that is very active economically, including shipping and energy production.

Israel's maritime environment borders with the Palestinian Authority and three countries (Lebanon, Egypt and Cyprus) in the Mediterranean, and with Jordan and Egypt in the Gulf of Eilat. Each of these areas has its own unique threats that must be addressed accordingly.

In addition, Israel is at a crossroad between East and West, expressed geographically as a place that connects the Red Sea with the Mediterranean and as a country with a land bridge that enables bypassing the Suez Canal. Israel's geographical location is also expressed culturally and conceptually as a country that must deal with the Red Sea eastwards, and the Mediterranean Sea westwards to the Atlantic Ocean.

9 Explanatory notes to the memorandum on the Maritime Areas Law, 2013, p. 4 [in Hebrew]: *"Indeed, the State of Israel is not a signatory to the Convention on the Law of the Sea and has not ratified it. However, the State of Israel takes upon itself the customary provisions of the Convention, including the provisions relating to maritime areas."* See also the agreement between the Government of Israel and the Government of the Republic of Cyprus on the demarcation of the exclusive economic zone, December 17, 2010.

Another characteristic that prominently affects the maritime environment is the fact that Israel has an "island economy." Israel does not have significant trade by land with the countries it borders (except for a few years during which Israel imported natural gas from Egypt, and assistance transporting goods to Jordan via the Port of Haifa). Furthermore, some of these countries are in a state of war or ceasefire with Israel, such that their borders are of course closed.

The majority of Israel's basic existential needs are imported by sea: for example, most of Israel's grains (wheat, rice, corn etc.) as well as crude oil that serves the energy needs of the Israeli economy. As a result, Israel's economy is almost entirely dependent on open sea lanes and ports that function continuously every day of the year, in both the Mediterranean and the Red Sea.

Israel's maritime economic environment contains significant natural gas reservoirs, and presumably also oil reservoirs, thus a nationally significant amount of business activity occurs there (hundreds of billions of dollars). This fact reinforces the need for a secure and comfortable environment that guaranties the Israeli economy a cheap, reliable and continuous energy supply, and income from natural gas export royalties.

It must also be remembered that Israel is a country with a small land area that lacks strategic depth. The shortage of available space affects the ability to plan and develop national infrastructure such as airports, desalination facilities, power plants, etc. The scarcity of available land, especially along the coast, where 80% of Israel's population is concentrated, arouses strong public opposition to any land use close to the waterfront. Against this backdrop, special consideration is required when it comes to coastal and maritime assets, and the complex balancing of various interests, including security, economy, housing and recreation.

The shortage of natural fisheries requires the development of advanced and environmentally balanced marine agriculture for a diverse, protein-rich food supply.

The development of its ports as part of the overall vision of Israel's foreign relations and international alliances must be a significant element in decision-making and as part of a clear strategy. In Israel's case, the decision of who owns and manages a port is not only an economic question (as European countries can perhaps relate to such a decision), but rather requires in-depth military assessment to ensure the continuous operation of the port and its support for the Israeli economy in times

of crisis and emergencies. Noteworthy here is the U.S.'s policy of not allowing a U.A.E.-owned port operator to operate some of the ports on its west coast.

As a result, there is no doubt that for Israel in the 21st century, this must be a central part of its maritime strategy. Israel does not have the privilege of neglecting this issue. Nonetheless, Israel must provide an integrated response to additional elements that relate to the maritime environment. The challenge we are faced with is to prioritize what needs to be part of Israel's grand maritime strategy model and what will be "left out," as an issue for the various government ministries and regulatory bodies to address (though these too must be based on the overall maritime strategy).

Maritime cluster as a means for formulating and implementing strategy

In most European countries, we can see the development of "maritime economic clusters" that in various ways bring together the stakeholders and entities connected to the maritime environment, in a way that enables the creation of a unified platform for open discourse and the creation of connections between bodies that assist in developing the economy mutually and constructively. Examples for stakeholders are shipping companies and maritime insurance companies, ports, various suppliers, representatives of naval forces, cruises and recreation, etc.

The purpose of the cluster is to discuss shared issues and recommend government policy to assist the various bodies in achieving their aims. Naturally, there is friction between the different bodies, and sometimes even contradicting interests, but the existence of a platform for open discourse and shared clarification of problems reduces the chances of mutual harm.

Such maritime clusters have been established with government encouragement or, alternatively, as private or public clusters (such as non-profit institutions or partnerships). The nature of the cluster also affects the funding of the various partners in the cluster. Such an cluster sometimes implements government strategy, while in other cases, or simultaneously, serves as a platform for creating understandings that in turn influence government strategy and policy. The main role of such an cluster is to serve as a strong maritime lobby vis-à-vis governmental bodies, in order to enable maximum strengthening of the economy while maintaining the security of the maritime environment and maximizing exploitation of resources, in order to achieve the country's strategic maritime objectives.

Israel has a strong, basic military need for maritime defense due to various threats, but at the same time there are a variety of other activities related to maritime trade, natural gas and energy resources, water desalination, the operation and maintenance of ports, fisheries, recreation and more. The amount of maritime activity in Israel and the number of companies, authorities and organizations involved in the maritime arena certainly enables and justifies the creation of a broad, integrated Israeli maritime cluster. In addition, as Israel borders on two seas, two maritime clusters can be established, one for the Mediterranean Sea and one for the Red Sea, and an economic network between the two clusters can be created, in which the defense element serves from the outset as the common denominator between them. Such an internal network could in the future develop and integrate into the European network of maritime clusters, and even create large-scale connections with clusters in Asia.

Another level of integration that should be examined is the government's level of involvement in such a maritime cluster. Should the government lead the creation of such an cluster in the initial stages, or is it preferable that it be established by an independent private or public body?

In order to answer this question, we must first properly define the various potential partners. It could be that the right way to create a large, inclusive maritime cluster is a gradual process that would at first be led by the government and would in time develop into a partnership with civilian bodies and leading maritime companies in Israel.

Properly integrating security needs with the economy by creating an integrated maritime cluster would allow for open, synergetic discourse that would enable public discourse on maritime-related issues in a professional, open and accessible manner; shared thought processes with policymakers; serve as a significant factor in the creation of a 21st century maritime strategy for Israel; and harness the sea as a growth engine for Israeli economy and society.

Main components of a maritime strategy for Israel

The State of Israel is in need of a grand maritime strategy derived from its national objectives and its overall strategic doctrine. Due to the many issues and components related to maritime strategy, it is necessary to focus on a limited number of issues. Some of the components are crucial and obvious, while others will be added during a process of consolidating the strategy and through discourse

with various stakeholders, and thus resources can be focused on achieving the right objectives.

The naval component continues to be the main maritime issue. Not only is it critical to Israel's physical security and existence, it is the main factor influencing the success of the rest of the components.

The economic component comprises the principle of "the sea as a growth engine," and includes **maritime trade,** which is the cornerstone of Israel's economy, and issues related to the **energy economy (which includes maritime infrastructure and artificial islands)**.

The third element is the **regulatory-planning element**, which relates to maritime law, sustainability and the environment.

The last element is the **social-public** element, which includes issues such as recreation, heritage and the public activity of the Israeli maritime cluster.

The Israeli model requires combining Israel's unique security needs and the demands of the Israeli economy, while taking into account the fact that Israel is an "island economy" and its location in the Eastern Mediterranean, a region that serves as a physical and cultural bridge between East and West.

Conclusion

The State of Israel does not have a grand maritime strategy. This situation has serious consequences for Israel's ability to coordinate policy among the various bodies involved in the maritime environment. In practice, there are clashing defense, economic, energy, and other interests. These clashes lead to a situation where each sector tries to maximize the resources for its needs, without an agreed-upon vision that guides the national maritime policy in a clear strategic direction.

The lack of a strategy is a significant stumbling block in incorporating the various interests in planning, legal, and environmental processes in maritime areas, and as such it has serious economic consequences.

Even in the absence of a grand national strategy, it is possible and necessary to create a grand maritime strategy that will serve as a strong basis for the success of the maritime environment both militarily and economically, connect different interests and prioritize among them on the basis of a long-term vision with the purpose of achieving the State of Israel's objectives for future generations.

The Haifa Center for Maritime Policy and Strategy is currently completing the formulation of a methodology that will enable the creation of a grand maritime strategy for the State of Israel.

The main issues recommended to be included in Israel's grand maritime strategy are:

1. National security: governance at sea, security and cooperation along maritime borders.
2. Shipping and ports: freedom of navigation (importing and exporting), construction of ports, and maintenance of ports.
3. Energy and infrastructure: coastal infrastructure (energy, desalination), marine infrastructure (drilling rigs, production, transport, artificial islands).
4. Regulation: planning, environmental protection and sustainability.
5. Society: recreation, heritage, manpower, academia and research.

Chapter 5: The Russian Navy's Strategy in the Mediterranean Sea – Current Operations in Historical Perspective

Tzevy Mirkin

General

Vladimir Putin's long-term strategy, based on the desire to restore Russia's image and status as a superpower – a policy unofficially dubbed "Russia rising from its knees" – has also influenced the Russian government's activities regarding maritime policy in general, and Russian policy on naval operations in particular.

Since the most recent wave of reforms in the Russian armed forces in 2009 (in practice these are not reforms but rather an attempt to rebuild the armed forces), the Russian leadership has attempted to demonstrate that the Russian Navy is regaining its greatness and is capable of carrying out missions befitting the navy of a superpower. One aspect of this is that the Russian leadership aspires to expand the navy's operations beyond the maritime regions adjacent to its coasts. In this context, those responsible for defense issues in Russia like quoting Tsar Alexander III's well-known saying: "Russia has only two allies – its army and its navy."

In July 2015, Russian President Vladimir Putin approved Russia's new maritime doctrine. This doctrine designated five operational arenas of the Russian Navy: the Atlantic arena, the Arctic arena, the Pacific arena, the Caspian Sea arena, and the Indian Ocean arena. The Arctic and Atlantic arenas received the highest priority, including a decision that one of Russia's main maritime objectives would be to restore a permanent presence in the Mediterranean Sea, which is considered part of the Atlantic arena.[1] In order to understand the thinking of Russia's political and military leadership on navy operations, we can quote the current commander of the Russian Navy, Admiral Vladimir Korolev, who said in an interview that "the navy of the country with the longest maritime borders in the world cannot afford to be weak."[2]

1 The Maritime Doctrine of the Russian Federation, published on the official website of the President of Russia, www.kremlin.ru. It should be noted, nonetheless, that the decision in principle to renew the navy's presence in the Mediterranean was made a few years prior, and its implementation began in January 2013, with the navy exercise held in this arena.

2 Our Navy's Strength Is in its Heritage: interview with the Naval Commander Admiral Vladimir Korolev," The Newspaper of Russia, July 31, 2016. From: https://rg.ru/2016/07/31/glavnokomanduiushchij-vmf-flot-rossii-ne-mozhet-pozvolit-sebe-byt-slabym.html

Historical background

The current Russian leadership likes to make reference to the longstanding heritage of the Russian Navy and Russian maritime activities. However, in actuality, for the first few centuries of its existence Russia was a land-based country and the Russian Navy was established at a relatively late stage. Russia's impressive territorial expansion throughout history was also mainly over land. The Russian Navy was only established at the end of the 17th century, when Peter the Great first raised the idea of Russia becoming a maritime power. The first stage in carrying out this objective was the attempts to take over the eastern coast of the Baltic Sea and the northern coast of the Black Sea. This policy led, naturally, to wars with Sweden and with the Ottoman Empire, which ruled at that time and forced Peter to begin building up the navy.

At the beginning, Russian military efforts – including naval efforts – focused mainly on the Baltic Sea, but within a relatively short time, the center of gravity moved to the Black Sea, and from the second quarter of the 18th century to the end of the 19th century, the Ottoman Empire was Russia's main adversary.

By the end of the 18th century, Russia's objective was to take over the northern coast of the Black Sea, and afterwards to expand Russia's territory in the region and ensure the free passage of Russian ships – both commercial and military – from the Black Sea to the Mediterranean. Russia's conception of its "historic right" to territories in the Black Sea region, including the Crimean Peninsula, developed during these wars, and was joined by the religious perspective that considered these wars a struggle against "heathens." Admiral Fyodor Ushakov, for example, a prominent commander of the Russian Navy in a part of the wars against the Ottomans in the 18th century, was proclaimed a saint by the Eastern Orthodox Church.

In the mid-19th century, Russia, in light of the "Eastern Question,"[3] began to grant more importance to the Mediterranean arena (especially the Eastern Mediterranean). The increasing involvement in this issue led to one of the greatest disasters in the history of the Russian military in general, and its navy in particular – the Crimean War defeat at the hands of the advanced armies of France and Britain.

3 The set of 19th century international disputes surrounding the status of the holy places in Palestine and the struggle for influence within the territory of the Ottoman Empire.

Russia not only lost its Black Sea Fleet, it was also forbidden from maintaining naval forces in this arena.[4]

Throughout its history, the Russian Navy remained merely a secondary support in Russian military campaigns. The navy did not play an independent or leading part in any war, and the bulk of its operations amounted to defending the coasts and supporting the ground forces. This continued to be the case in World War II, during which the navy did not carry out any independent missions. An attempt to go beyond this limited role was only made in the 1960s, when then-commander of the Soviet Navy, Admiral Sergey Gorshkov, initiated the transformation of the navy into a strategic armed force, and began an ambitious program to create a navy capable of operating throughout the oceans. He even succeeded in changing the way naval operations were perceived, and promoting the doctrine of the navy's permanent presence at key points around the world. As part of implementing this doctrine, a number of "operational squadrons" were established and stationed in distant maritime arenas. The first of them, the Fifth Operational Squadron, operated in the Mediterranean.

These changes resulted mainly from the Cold War rivalry with the U.S., and were part of attempts to offset American military power. The Soviet leadership during the Nikita Khrushchev period (1953-1964) placed a clear priority on developing the strategic nuclear component of the armed forces, in effect neglecting the conventional component. One of the main reasons for Gorshkov's success was his ability to convince the leadership that the naval forces could be an important component of Soviet strategic nuclear power. As a result, a clear priority was placed on building up the submarine force.

In addition, demonstrating naval power was seen by Gorshkov and his associates as an essential "status symbol" for a superpower. According to a number of accounts, in every discussion, Gorshkov demanded to hear "how the Americans solve problems similar to those being discussed."[5] Admiral Nikolay Amelko, who during the 1970s served as deputy commander of the navy for anti-submarine

4 Officially, the agreement spoke of the neutralization of the Black Sea. This clause applied to both Russia and the Ottoman Empire. In practice, the Ottomans could maintain battleships and navy infrastructure in the Marmara Sea and in the eastern part of the Mediterranean, while Russia did not have the ability to quickly move marine forces from another arena. The text of the agreement, according to the Moscow University Faculty of History website: http://www.hist.msu.ru/ER/Etext/FOREIGN/paris.htm.

5 Манойлин, В.И. Базирование Военно–морского флота СССР – Manoylin, V.I., *Bazirovanie Voenno–morskogo flota SSSR (The deployment of the Navy of the USSR)*, (Petersburg, Нева, 2004), p. 286.

warfare, defined Gorshkov's doctrine as: "If the Americans have it, then we also need to have it."[6]

Considering the fact that the Soviet leadership never put its navy into action as a power lever in regional conflicts, and made do with "flag-waving" vis-à-vis the Americans, we can assume that in practice, the doctrine and the operation of the Soviet fleet was based on the principle of a "fleet in being," whose main purpose is to challenge the adversary's fleet through the very existence of a powerful fleet.[7]

These operations were a considerable part of the increase in the Soviet Union's defense budget, which was one of the main reasons for the collapse of the Soviet economy in the second half of the 1980s. As a result, even before the fall of the Soviet Union, a significant decrease in the operations of the Soviet fleet began. After the Soviet Union ceased to exist, most of the Soviet fleet became Russia's fleet, and its budget was cut (along with the funding of the armed forces in general) to the absolute minimum, due to the severe economic crisis that plagued Russia.

This remained the case during the first few years of Putin's rule. At the beginning of his first term, Putin took a step seen by many in Russia as the destruction of one of the last remnants of the "glory age" of Soviet military power, when in 2001 he decided for economic reasons to close the Lourdes electronic intelligence collection center in Cuba and the Russian fleet's facility in Cam Ranh Bay, Vietnam.[8] However, this decision did not apply to another Russian facility – the Tartus base in Syria (which Russia retained even after ending the permanent presence of its naval forces in distant arenas).

Russia's doctrine changed completely in 2004. The stated reason for this was the terrorist attack in the city of Beslan in the North Caucasus. In an address to the nation after the attack, Putin presented a new paradigm, in which he defined the collapse of the Soviet Union as "the greatest geopolitical disaster of the 20th century," and declared that "we showed weakness – and those who are weak get hit."[9]

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6 Амелько, Н.Н. В интересах флота и государства: Воспоминания адмирала – Amelko, N.N. *V interesakh flota i gosudarstva: Vospominaniya admirala (In Accordance to the Interests of the Navy and of the State: The Memoires of the Admiral)*, (Moscow, Наука, 2003), p. 129.

7 Y. Harkabi *War and Strategy*, Tel Aviv, Maarachot, 1990, p. 176.

8 Дешевле Лурдеса, надёжнее Камрани" ("Deshevle Lurdesa, nadezhnee Kamrani",) in: Kommersant–Vlast, Oct. 30, 2001.

9 https://lenta.ru/russia/2004/09/04/putin/

The Russian fleet's main problems

Since the inception of the Russian fleet over 300 year ago, several basic geopolitical traits have hampered its development and prevented Russia from fully developing naval capabilities like other superpowers.

The first problem is the "land-based" tradition of Russian expansion. In contrast to other naval powers such as Britain, Spain or Portugal, at the beginning Russia did not border on countries with comparable military capabilities, thus nothing prevented Russia from expanding over land. The land strategy was preserved even when Russia faced stronger adversaries such as Sweden and the Ottoman Empire. These geopolitical traits of Russian expansion since its formation as a state in the 15th century have led to its naval fleet having a secondary role in the Russian military.

The development of Russia's naval power was also influenced by geographic conditions. The Russian fleet operates in a number of separate arenas (the Baltic Sea, the Black Sea, the North Sea, the Pacific Ocean and the Atlantic Ocean), and the connection between the different arenas, as well as their connection to the Oceanic arenas, is limited. Exiting the Black Sea and the Baltic Sea require passing through straits which are not under Russian control. Passage from the Arctic Ocean to the Atlantic Ocean involved passing through areas controlled in practice by other countries, while the main bases in the Pacific Ocean are separated from the open ocean by the Kuril Islands and Japan.

The very fact that the maritime arenas are separated from one another has also influenced the capabilities of the Soviet fleet, and later also the capabilities of the Russian fleet, to move forces from one arena to another. The most prominent example of this is the Russo-Japanese War of 1904-1905, during which the Russians were forced, after the fleet's defeat in the Pacific Ocean, to send a flotilla from the Baltic Sea as reinforcements. The flotilla sailed through the Atlantic Ocean and the Indian Ocean without stopping along the way.

Russia's current naval strategy in the Mediterranean arena

Since Russia began rebuilding its armed forces in the previous decade, the country's leadership has seen naval operations as a means of demonstrating the restoration of Russia's military power and of Russia's international status as a world superpower.

At first, these operations had four primary aspects:

1. Renewal of sea patrols in the northern Atlantic, which was a traditional arena of activity of the Northern Fleet.
2. Improved military capability in the Arctic – from the political leadership's perspective, increased presence in the area is one of the main features of restoring Russian power. An inseparable part of this is developing military infrastructure and expanding military activity in general, and naval operations in particular, in this area. The official explanation for this is the need to protect Russian positions in the Arctic given increased international competition for natural resources in the region. It is noteworthy that an unmanned Russian submarine symbolically placed the Russian flag on the sea floor in the North Pole area in 2007.
3. Participation in international operations against piracy near the Somali coast: Russia began operating against pirates in the western Indian Ocean alongside an international force as early as 2009 because its commercial vessels were among those attacked and also because it saw the operation as one of the most important international naval operations.
4. Renewal of the fleet's operations in the Pacific Ocean. The main aspect of this was the development of cooperation with the Chinese navy, including joint exercises that the naval forces participated in, including Russian Marine units.

Only later did the Mediterranean come into view. Although the Russian fleet conducted isolated operations in the Mediterranean even during Russia's most difficult period in the 1990s, significant signs of Russia's return to this arena only appeared in 2007, when Russia's only aircraft carrier Admiral Kuznetsov sailed from its home port in Severomorsk on the Barents Sea to the Mediterranean. As mentioned above, the decision to renew a permanent presence in the arena was only made later, in 2010.

Russia's defense doctrine in the post-Soviet era is characterized by Russia not directly discussing the possibility of outright war, but rather addressing threats to Russian interests, areas of influence, or allies. This is also apparent in its current military doctrine, approved in December 2014 during the height of the Ukraine crisis and after Russia's invasion of the Crimea, which led to the most significant tensions in Russia's relationship with the West since the end of the Cold War. However, at the top of the list of threats is increased NATO military potential,

NATO's progress towards Russia's borders, and the deployment of foreign military forces in countries bordering Russia or its allies.[10]

Russia's naval doctrine also mentions the NATO alliance as a threat (through not a direct military threat). According to this doctrine, "the decisive factor in NATO relations is the fact that the progress of the alliance's military infrastructure towards Russian borders, and allowing the alliance to have a global role, remain unacceptable to the Russian Federation.[11]

In practice, the need to renew the Russian fleet's permanent presence in the Mediterranean stems directly from this doctrine, primarily because of the presence of the U.S. Sixth Fleet in the Mediterranean, which, with the decreased U.S. presence in Europe and the European countries' military cutbacks after the end of the Cold War, remains NATO's strongest force, and that stationed closest to Russia's borders.

Since the Russian fleet's return to the Mediterranean, there has been a clear preference for highly visible actions in the arena, such as exercises and flag-waving. This supports the assumption that these actions are in accordance with the "fleet in being" principle, and are primarily a demonstration of the Russian fleet's permanent (or relatively permanent) presence in the arena, even if the extent of the forces is significantly smaller than that operated by the Soviet Union in the arena some 25 years earlier. In September 2013, two years after the approval of the current naval doctrine, the Russian Forces in the Mediterranean Command was reestablished, and ships sent from other arenas, including the Pacific Fleet, became subject to it.[12]

Under these conditions, the Russian naval base at Tartus has regained importance.[13] With the permanent presence of Russian ships in the Mediterranean Sea, the Tartus Port serves as their main port. This is especially significant considering that ships from Russia's Northern Fleet have been sent to the Mediterranean (for example, the Admiral Kuznetsov aircraft carrier).

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10 The Russian Federation's Military Doctrine (2014), Section 12, from the official page of the Russian President: http://static.kremlin.ru/media/events/files/41d527556bec8deb3530.pdf

11 The Russian Federation's Naval Doctrine, from the official page of the Russian President www.kremlin.ru

12 Official website of the Russian Ministry of Defense, http://function.mil.ru/news_page/country/more.htm?id=12096837@egNews#txt

13 Sometimes the Tartus facility is considered a naval base, but in fact, according to the official definition as well as in reality, the Tartus facility is not a true naval base but rather only a "maintenance and supply point."

A new stage of operation for the Russian fleet in the Mediterranean and the region began in September 2015 when Russian forces were sent to Syria to support the regime of President Bashar al-Assad.

Though the majority of Russian operations in Syria are conducted by the air force, the Russian fleet has two important tasks in the operation: responsibility for transporting forces to the combat zone and responsibility for transporting supplies from various ports in the Black Sea (an operation unofficially dubbed the "Syrian Express" in Russia). In addition, the Russian Marines, which are part of the fleet's forces, are responsible for ground security of the bases where Russian air force squadrons are stationed.

At the start of the operation, the naval forces had a very limited role. The ships in the eastern part of the Mediterranean Sea were tasked primarily with logistical support for the Russian forces in Syria. According to Russian Defense Minister Sergey Shoygu at a meeting of the leadership of the Russian Ministry of Defense on September 21, 2016, there were at least six warships and 3-4 support ships permanently stationed in the Mediterranean at that point, belonging to each of Russia's four fleets.[14]

However, over the last year, Russia's use of naval forces in Syria has increased. Russian warships have repeatedly fired cruise missiles at targets in Syria. The missiles have been fired by both Black Sea Fleet ships currently in the Mediterranean and relatively close to the targets, as well as by Caspian Sea Flotilla ships. Meanwhile, TU-22M strategic bombers (designated Backfire by NATO), stationed in Russia itself, have been used to attack targets in Syria by air. In addition, a decision was made to send the aircraft carrier Admiral Kuznetsov to join the ships in the Mediterranean,[15] and it crossed the English Channel on its way to the Mediterranean Sea in October 2016.

Because the effectiveness of using cruise missiles against Syrian rebel targets and the operational need for long-distance cruise missiles and strategic bombers are unclear, the main reason for using these weapons was presumably to demonstrate Russia's ability to conduct this type of attack, and to signal to the international community – or at least to create the impression – that Russian capabilities are equal to those of the United States.

14 Report on the official website of the Russian Ministry of Defense, http://function.mil.ru/news_page/country/more.htm?id=12096723@egNews

15 Report on the official website of the Russian Ministry of Defense, http://function.mil.ru/news_page/country/more.htm?id=12096723@egNews

Conclusion

In 2016, an important part of Russia's military operations in general, and in the Mediterranean arena in particular, was demonstrating its naval power. However, the role of the naval forces, including those stationed in the Mediterranean, remains being a "fleet in being."

As for the role of the naval forces in operations, their role continues to be what it was throughout the history of the Russian fleet. The naval forces fulfill a support role, even though today the combat is in a distant combat zone with no direct access to Russian territory, and is therefore a challenging arena from an operational and logistical perspective.

Chapter 6: Iran – the Maritime Involvement and Influence in the Red Sea and the Eastern Mediterranean Sea

Yoram Laks

Iran and Israel; geopolitical aspects

The Iranian presence within the first circle around Israel was significantly increased with the entry of the Iranian forces into actual combat in Syria, shoulder to shoulder with the Assad regime, Russia and Hezbollah. This activity, which has become overt and active, and which has included losses and public criticism from home, already today provides the Iranians with multiple leverages in Syria and special status in the negotiation on the future of Syria, or, in the alternative, a demand for repayment of the investment by the Syrian government, if it survives.

An additional result is the institutionalization and strengthening of the Russian, Syrian, Iranian and Hezbollah axis, which may prompt processes, overt and covert, of transfer of information, technologies and weapons to Iran. A further concern is that the strengthening of this axis is liable to accelerate the transfer of weapons and of technologies from Iran to Hezbollah, under the patronage (even if covert) of Russia. The further arming of Hezbollah is liable to have grave consequences as far as Israel is concerned, at the strategic level and at the operational level alike.

Iran's power base in east mediterranean region is the Hezbollah organization, a local Lebanese organization that is funded and directed by 'Quds Force' of the Iranian Revolutionary Guards. Hezbollah has a maritime force with powerful coast to sea capabilities, which could compete with the capabilities held by sovereign states. This maritime force includes an intelligence array, detection capabilities, battle picture building capability and lounching to sea capability on mobile and stationary targets (as proven by the Second Lebanon War 2006, in the course of which Hezbollah tracked the 'INS Hanit' ship of the Israeli navy). Since then, Hezbollah has become stronger and developed additional maritime and other capabilities. The fighting of Hezbollah alongside the Assad and Russian forces in Syria provides it with vast operational experience and exposes it to capabilities, tactics, and the modus operandi of armies of sovereign states such as Syria and a super-power such Russia.

Major trends

In a situation assessment of the characteristics of the Iranian maritime involvement anticipated in 2017, we can propose an assessment of the primary trends and of the manner in which they may affect the characteristics and intensity of the involvement.

The nuclear deal: This deal constitutes the key designing and restraining aspect in Iran's conduct vis-à-vis the West. Since this is a tiered agreement, which stipulates the thawing of the commercial sanctions and the receipt of the economic and military benefits upon its observance for at least four years, it should be expected that Iran would want to observe the agreement verbatim, as long as there is no threat of its cancellation by the West.

The election results in the United States: The President Elect and his foreign policy constitute a significant 'area of uncertainty'. Presumably, this uncertainty will first prompt deep restraint and later will lead to a cautious testing of boundaries. The belligerent declarations on the one hand and the isolationism on the other hand, of the President Elect, together with the threat to cancel the nuclear deal, will probably prompt conservatism in all matters pertaining to friction with the United States, but may result in 'the launching of experimental balloons' in other arenas or on other topics.

The presidential elections in Iran: The anticipated elections in Iran, in May 2017, will determine whether the moderate reform process, which yielded the nuclear deal with the super-powers, will continue, or the hard conservative line will return to power. It should be kept in mind that above the president stands 'the Supreme Leader', who determines the overall policy (since 1989 this post has been held by Ali Khamenei who is known for his hard line). Presumably, the decision on holding the elections will prompt Iran to want to avoid moves that may implicate it, beyond the present physical involvement in Syria and the deep involvement in Iraq and Yemen. Nonetheless, it stands to reason that the Iranian government would still want 'to make a show of force', probably in an arena close to home, in order to demonstrate resoluteness vis-à-vis conservative rivals from home, who will claim that it has capitulated to the West.[1] From the conclusion of the elections and until the transition of power, if such occurs, certain stagnation is expected and this

1 Iranian Press (June 19th, 2016) Iranian Navy Heading to Aden Gulf and The Government Wants to Hide the Failure of Negotiations from People. http://arabiangcis.org/english/iranian-press/iranian-press-19-jul-2016-iranian-navy-heading-to-aden-gulf-and-the-government-wants-to-hide-the-failure-of-negotiations-from-people

assuming that the strict control of foreign activity of 'the revolutionary guards' will continue.

A significant threat to the very existence of the nuclear deal, or an attempt to alter it, certainly a public attempt, would very likely prompt the Iranian government to perpetrate a belligerent and bold action, which would threaten the survivability of the reform presidency and would influence the election results.

Figure 6.1 Players in the Iranian nuclear deal

The Iranian maritime force

In Iran there are three components of maritime force. The first is a maritime policing force whose missions are domestic, the second is the maritime branch of the Iranian military and the third is the maritime branch of 'the Revolutionary Guards'.

The Islamic Republic of Iran Navy

The Iranian fleet was conceptually and armamentally a Western fleet. Over the years, in light of the sanctions imposed on the country, Iran transitioned to purchasing from China, from North Korea and from Russia, but primarily it

relied on self-production of vessels and of maritime armaments. As a result of the internal and geopolitical events, the operating concept of the fleet was changed to a concept with defensive characteristics.[2] Consequently, changes occurred in the emphases and in the combat doctrine, such as significant reinforcement of the coast to sea array and of the mining array.

However, the fleet also retained classic missions of projecting power, demonstrating presence, activity over the expanses of the ocean and the sea beyond the waters of the Persian Gulf and maintaining the national interests of Iran on the open sea.

The Iranian fleet is composed of an order of battle of 3 outdated Russian Kilo class submarines and a large number of self-produced medium and small sized submarines.[3] The large number of small submarines enables redundancy, decisive activity with a concentration of force against threatening vessels and carrying out rapid mining activity (primarily in the Persian Gulf and in the Strait of Hormuz). Furthermore, a considerable portion of the small submarines have a special purpose capability of carrying incursion fighters for executing offensive activity and minor tactics warfare, primarily against nearby countries (the Persian Gulf countries) and in infrastructure facilities at sea.

The surface fleet consists of a mix of outdated western vessels and self-built vessels. The order of battle includes 6 frigates, some of them self-built, 3 old corvettes produced in Great Britain and Holland, a large number of missile boats and patrol boats (some of them armed with short range missiles, most of them produced in China, North Korea and the local industry).[4] The Iranian fleet is also equipped with amphibious vessels, landing vessels and auxiliary and supply vessels.

A small portion of the fleet is situated in the Caspian Sea, but it is mainly scattered among ports in the Persian Gulf and along the shores of the country.

In recent years, the fleet has been implementing power projecting voyages of a pair of vessels, generally an offensive vessel and of auxiliary and supply vessels. The voyages are implemented both in an easterly direction (including a port visit in China) and also westward, towards the Red Sea and Somalia (including

2 Iranian Navy troops continue maneuvers in Sea of Oman https://www.youtube.com/watch?v=p9q9Hx_AYz4 (Iranian Navy Drill).

3 Iran building new submarine with missile-launching capability http://theiranproject.com/blog/2015/02/18/iran-building-new-submarine-with-missile-launching-capability

4 New warships, frigates join Iran Navy's fleet http://theiranproject.com/blog/2014/12/01/new-warships-frigates-join-iran-navys-fleet

involvement and monitoring of the events in Yemen). This force is also involved in anti-piracy activities, which has reached operational manifestation. This is an independent, external force to the 'international task force'.[5] As the supply ports for this activity, heading westward, the Port of Djibouti and the Port of Sudan were sometimes used.

The force has crossed the Suez Canal three times (2011, 2012) the force crossed the Canal while patrolling the Eastern Basin of the Mediterranean Sea and docking in Syria. Once the force remained in the mouth region of the Suez Canal and turned back. These voyages were accompanied by belligerent statements by the fleet command. These statements continue to appear occasionally in speeches, which declare that the Iranian fleet intends to proceed with continuous activity in the Mediterranean Sea. Recently (December 2016), there were several announcements of voyages also in the direction of the Atlantic Ocean.[6]

Figure 6.2 Vessels of the Iranian fleet

In the course of 2016, the main activity of the fleet was large scale and publicized exercises and maneuvers, which included collaborations with foreign fleets such as

5 4 pirate attacks on cargo ships thwarted by Iranian warships in Gulf of Aden. http://theiranproject.com/blog/2015/09/17/4-pirate-attacks-on-cargo-ships-thwarted-by-iranian-warships-in-gulf-of-aden

6 Impact of Iran's warships' voyage to Atlantic. http://theiranproject.com/blog/2016/12/04/impact-irans-warships-voyage-atlantic

the Indian fleet [7] the Pakistan fleet[8] and the Italian fleet. Concurrently, the Iranian fleet proceeded with its long term activity in an Easterly direction (the Indian Ocean)[9] and heading westward (in the region of Somalia and Bab el-Mandeb) and was also involved in attempts to transfer weapons to Yemen.

The Revolutionary Guards Navy

The Revolutionary Guards (hereinafter RG) fleet is built on an asymmetric combat concept, which is based on a very large number of small vessels (The largest among them are the size of a missile boat with displacement of approximately 200 tons), of attack vessels and of torpedo boats. These vessels are equipped with combat systems of various models and with missiles and torpedoes with a great deal of technological variance (most of them are produced in Iran based on a special purpose operational requirement), and with advanced maritime mining capabilities. Furthermore, the fleet has a coast to sea assault array, which is based on missiles positioned in fixed or mobile coastal systems.

The main mission of the Revolutionary Guards Navy is protection of the homeland in the Persian Gulf,[10] and along the southern coast, with offensive and initiated activity against attackers. The fleet is trained in tactics of assimilation, of camouflage, of disguise, of swarming[11] of saturating targets and threats of different categories simultaneously, as well as additional tactics.

Within the asymmetry, there is also an element of 'psychological-warfare', while generating friction and constant threat, as was revealed in the attack maneuver on the American aircraft carrier model, in the takeover of the U.S. vessels, in the publication of the photos of the captured sailors,[12] and in additional incidents. There is a certain overlap in the areas of operational responsibility between the fleet of the Revolutionary Guards and the fleet of the Islamic Republic of Iran Navy. Although the command and control arrays are completely separate, there is a basic cooperation between the two fleets.

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7 India, Iran in naval drills. http://www.marsecreview.com/2016/05/india-iran-in-naval-drills

8 Iran's naval fleet docks at Karachi for joint exercises ahead of 'Aman 17' http://www.dawn.com/news/1286466 Iran's naval fleet docks at Karachi for joint exercises ahead of 'Aman 17'

9 Navy's 42nd Flotilla Saves 7 Iranian Sailors in Indian Ocean. http://ifpnews.com/news/politics/security/2016/08/navys-42nd-flotilla-saves-7-iranian-sailors-indian-ocean

10 http://www.timesofisrael.com/iranian-commander-threatens-to-close-strait-of-hormuz-to-us

11 http://dailycaller.com/2016/09/06/seven-iranian-attack-boats-swarm-us-navy-ship-in-the-persian-gulf

12 US sailors divulged information during Iran capture. http://www.timesofisrael.com/us-sailors-divulged-information-during-iran-capture

'Quds Force' of the Revolutionary Guards is the key component in the military involvement outside the Iranian borders and is responsible for direct involvement overseas, for subversion, for weapons smuggling, etc.

From the beginning of 2016 to September 2016 the number of friction incidents in the Persian Gulf between RG vessels and other vessels (primarily US fleet vessels) reached 31 and this compared with 23 incidents during all of 2015.[13,14,15]

The RG maritime branch engaged in 2016 in creating friction and warning vis-à-vis the Western fleets mainly the United States fleet.

The branch mainly engaged in transfers of weapons to Yemen and in operational trainings, which culminated in the firing of coast to sea missiles.

Figure 6.3 Vessels of the Revolutionary Guards fleet

13 Iran escalates high seas harassment of US Navy. http://edition.cnn.com/2016/09/06/politics/iran-us-navy-confrontation

14 US Navy ship fired warning shots at Iranian ship; 4 Mideast close calls this week http://www.foxnews.com/world/2016/08/25/us-navy-ship-fired-warning-shots-at-iranian-ship-in-2nd-mideast-close-call-this-week.html

15 U.S. Navy Says Video Shows Iranian Navy Firing Rockets Near Warships in Strait of Hormuz. http://gcaptain.com/u-s-navy-video-shows-iran-navy-fire-rockets-near-warships-in-strait-of-hormuz

Maritime involvement in Yemen

There is a historic rivalry in Yemen between the Zaidi Shia minority and the Sunni majority. This rivalry led, as of 2001, to several rounds of fighting and of suppressing insurgencies. Since 2014, the hostility has come to actual combat, including occupation of territories by the Shia and an attempt to pursue a full takeover of the country, while occupying the capital city of Sana'a (which led to transferring the governmental center to a region controlled by the Sunnis) and occupying the coastal region including the port city of Hudaydah.

The Zaidi Shia forces, headed by the Houth clan from north Yemen (and who are sometimes called Houthis) have been supported for many years by the Iranians through the Revolutionary Guards in a variety of measures and forms. For these forces, occupation of the port city of Hudaydah – which is located approximately 130 nautical miles from the Bab el-Mandeb Strait and approximately 80 nautical miles from Eritrea, on the other side of the Red Sea – has opened a window to the outside world.

In March 2015 a multinational force was established, in coordination with the Yemeni government, which initiated operation 'Decisive Storm' against the Houthi forces. The force was comprised of ten countries, with the leader among them being Saudi Arabia followed by the Gulf countries: Qatar, Kuwait, Bahrain and the United Arab Emirates.

This coalition announced a maritime blockade and it allows vessels to enter the region controlled by the insurgents only after a cargo inspection.

The Iranians failed several times in their attempts to smuggle arms into the region. The coalition forces seized various vessels with weapons several times. Concurrently, Iranian vessels, which openly declared their intention to transfer humanitarian cargo to insurgents, were forced to turn back after having refused an inspection of their cargo. In April 2015, there was an Iranian attempt to transfer a convoy of merchant ships guarded by combat vessels. This convoy was also forced to return to Iran following diplomatic clarifications of several countries, mainly the United States, with respect to their readiness to prevent the docking of the ships in Yemen. Presumably, part of the cargo was not seized and managed to reach its destination.[16]

16 Why Iran supported Houthi attacks against the US Navy. http://www.longwarjournal.org/archives/2016/10/why-iran-supported-houthi-attacks-against-the-us-navy.php

Figure 6.4 Route map of attempts of smuggling weapons by the Iranians to the Houthi insurgents (in the photo: an Iranian ship)

The Iranians on their part armed the Houthis with maritime capabilities that would help them cope with the blockade, including coast to sea missiles (some of them apparently an Iranian or Chinese version of C-802 missiles). This arming required, at a minimum, active Iranian involvement in training and in positioning of the systems.

In the course of October 2016, at least four missiles were fired on military vessels in the region north of the Bab el-Mandeb Strait. One missile hit a troop transport vessel of the United Arab Emirates.[17] Two attacks on American vessels ended without injury. In response, the Americans attacked with cruise missiles three maritime radar stations on the shores that are controlled by the Houthis. It seems that these radar stations,[18] according to the American's understanding, assisted in detection of the position of the forces at sea. Presumably, Iran was involved, to some extent in their operation. Firing missiles on American vessels, let alone the firing the second time, which followed media publicity with respect to the firing on vessels of the United States fleet, constitutes a significant escalation. The kinetic response received clarified to the Iranians that the Americans regard them as bearing the responsibility, either partially or exclusively. Following this attack, the Iranians announced in mid-October 2016 that they would send a task force to the Red Sea in order to defend against pirate activity and protect the Iranian national interests. A continued attack of Western vessels may lead to a more decisive response against Iranian interests in the region.

17 http://www.businessinsider.com/photos-us-navy-ship-damaged-houthi-missile-yemen-2016-10

18 http://www.businessinsider.com/photos-us-navy-ship-damaged-houthi-missile-yemen

Figure 6.5 Vessels of the United Arab Emirates fleet that was damaged by a coast to sea missile

The presence of coast to sea missiles, which have a shooting range that reaches to the Bab El-Mandeb Strait and which covers the entire width of the Red Sea up to the Eritrea shores, may, if first used against commercial vessels, lead to a rise in maritime insurance prices and may prompt the global shipping sector to consider using an alternate route other than through the Suez Canal. Such risk would lead to increasing involvement of Egypt and of other effected nations to eliminate the threat to the international shipping routes. This may be the explanation that the Houthi firing was done towards military and not commercial vessels. Nonetheless, it should also be noted that the trade routes moved westward as a result of the fighting in this region.

The involvement in Yemen enables Iran to fight its traditional rival, Saudi Arabia, through a third party (proxy), in a region outside the Persian Gulf and thereby to create Iranian separation from the fighting and to reduce the threat of harm to significant interests of Iran in the Persian Gulf. The presence of coast to sea missiles in Yemen, close to Saudi Arabian ports, constitutes a strategic achievement for Iran and enables it to exert pressure on the Saudis, both in the Red Sea and in the Persian Gulf, while attempting to destabilize the Saudi regime

The presence in Yemen constitutes a base for the Revolutionary Guards and serves them as a springboard to the North-West. Yemen constitutes a way station for weapons, in order to facilitate distribution and smuggling of advance capabilities to the Gaza Strip and to Lebanon. A base on the shores of the Red Sea enables smuggling by sea and opens overland transportation options through Africa and Egypt. This way, station, although it is closer to Israel, would make it operationally difficult for the Israeli and Western intelligence and operational to thwart the shipments. If the intensity of the conflict in Yemen lessens as a result of negotiations or another turnaround, the Western pressure (intelligence and

operational) will become more moderate in this sector. The Iranians on their part will attempt to reach an agreement that will establish an Iranian home port in Yemen, either in the region controlled by the Houthis or as part of negotiations to resolve the conflict. Such a process would release assets, weapons and manpower of the Revolutionary Guards and would enable operational flexibility and smuggling activity in the east Mediterranean.

Maritime weapons smuggling efforts from Iran to East Mediterranean

Over the years, the Iranians, led by 'Quds Force' of the Revolutionary Guards, has made considerable efforts to transfer weapons 'to Hezbollah' in Lebanon and to the Palestinians in the Gaza Strip (both to 'Hamas' and to the 'Palestinian Islamic Jihad'). The predominate part of the weapons in the last decade came to Lebanon through Syria and to the Gaza Strip through Egypt (over land to the Sinai Peninsula and from there to the Gaza Strip). The arrival of weapons to Egypt was overland, through Sudan or through Egyptian transshipment ports to which weapons and raw materials came from other transshipment ports in the Middle East or in Europe.

Several attempts to transfer large quantities of weapons by sea were thwarted and exposed to the public (in certain cases the exposure was done by foreign media). The last attempt that was thwarted occurred in March 2014. The ship 'Klos C' sailed for the Port of Sudan from Iran through a port in Iraq, in an attempt to cover up the Iranian involvement, while it was carrying M-302 ground to ground missiles on board. It seems that after unloading the cargo at the Port of Sudan, the weapons were supposed to arrive overland to the Gaza Strip.

The capture of the ship exposed several of the Iranian smuggling methods, which include use of unsuspected commercial companies and ships whose crews are unaware of the content of the containers on board. Furthermore, the involvement of transshipment ports was partially clarified, including ports in Europe and in Egypt (several publications on thwarting the smuggling of containers of weapons at European ports). According to foreign media, the Israeli air force and navy intercepted further attempts to smuggle weapons, among them of the ship 'Francop' in November 2009, and the ship "Victorya' in March 2011. Moreover, the foreign media wrote of attacks of the Israeli air force and navy on vessels and convoys in the Sudan region. Furthermore, information was accumulated in Israel of such that in the not so distant past there was a smuggling route from Yemen to the shores of Sudan and Egypt, which relied on local smugglers on small vessels.

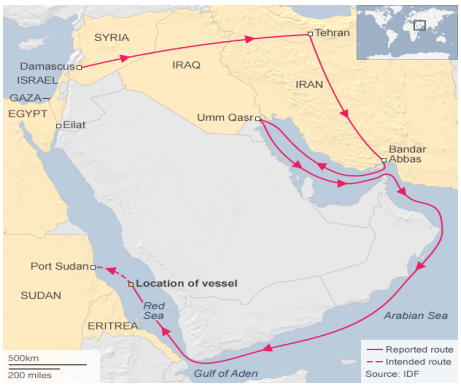

Figure 6.6 Weapons smuggling attempt on the Klos C ship

During the course of the summer of 2014, the Sudanese government changed its policy towards Iran. First Sudan closed down the Iranian cultural centers and then it distanced itself, at least outwardly, from the Iranian hegemony and joined the task force headed by Saudi Arabia and Yemen. The significance of these measures in terms of Iran was blockage of the transshipment capability of the weapons in Sudan in general and at the Port of Sudan in particular. Since those moves, the Iranians have been attempting to establish a different home port in Yemen or in Eritrea where they would be able to operate freely.

The continuing fighting in Syria has led in its wake to the involvement of the super-powers and increased maritime presence in the region of a large number of nations with various interests, including diversion of vast intelligence resources of the international community. This presence has heightened the risk for Iran in transferring weapons to Hezbollah through the sea ports in Syria and has made this activity more complex.

Concurrently, the Iranian involvement in the fighting alongside Hezbollah in favor of the Assad regime may provide the Iranians with other alternatives. Presumably,

if and when the fighting in Syrian abates, or advances to the negotiation stage, Iran will aspire to receive a reward for its efforts. Part of this reward is expected to be a home port in Syria, which will facilitate easier transfer of weapons and forces to Hezbollah and above all, a permanent Iranian presence in the Eastern Mediterranean Sea.

The issue of Iranian ability to dock and to use ports in the Eastern Mediterranean Sea may also be relevant to Lebanon and this in light of the appointment of a new president in Lebanon who is acceptable to Hezbollah, although internal and external pressures against the new president are expected.

Concurrently, the Iranians came to an agreement with Italy on providing port services to their vessels and this following a port visit of the Italian fleet in Iran[19] in September 2016.

Trends for 2017

The Iranian fleet will continue in its long-term activity under the heading of 'fighting pirates', primarily towards the Horn of Africa region, while demonstrating presence in the Yemen region and power projection missions, which if possible will reach the Mediterranean Sea or the Atlantic Ocean, including ports visits and maneuvers with foreign fleets.

The Revolutionary Guards, including the maritime branch, will operate under the moderate policy of the presidency, although presumably they will increase the friction activity in the Persian Gulf in order to provide 'aggressive' images to the government for domestic purposes.

'Quds Force' will continue to support insurgents in Yemen, including transfers of weapons in the red sea and to the mediterranean, while attempting to separate and distance Iran from direct linkage to operational events.

The support of the Hezbollah maritime force building process will continue, under Iranian budget constraints on the one hand and the allocation of Hezbollah resources and inputs on the other hand.

The merchant navy of Iran, which was involved in smuggling and in efforts to break the international economic sanctions on Iran, is under an international embargo that led to creative efforts for its operation. Upon removal of the sanctions, the

19 Italian Navy Warship Docks In Iran. http://yournewswire.com/italian-navy-warship-docks-in-iran

Iranians are expected to rebuild the national shipping company,[20] which shall serve as a component in the national and military axis.

Iran has a significant interest in the establishment of home ports outside Iran that would be used both for official port visits and as a base for transfers of weapons, which would replace the Port of Sudan. These ports may be situated in Yemen or in Syria, as part of the arrangements to be made after the cessation of fighting in these countries, or within the framework of signing an arrangement or consent of the host countries, such as Italy, Syria, Lebanon and Djibouti.

The process of recognition of the implications of the nuclear deal from purchasing perspectives will continue, while attempting to upgrade and to overhaul the combat systems, the ships and the submarines. Concurrently, we can expect an attempt to purchase components for the weapons and for the systems that the Iranian industry has had difficulty to produce on its own, such as advanced combat and communication systems. At this stage, the Iranian military industry, including the marine systems, will continue to maintain R&D and self-production capability.

20 Iran's Revolutionary Guard faces problems as economy opens. http://www.japantimes.co.jp/news/2016/12/17/business/economy-business/irans-revolutionary-guard-facesproblems-economy-opens/#.WFUWmlUrLIU

Chapter 7: The maritime aspect of cyber warfare

Eitan Yehuda

General

In recent years, on top of the terrestrial, maritime, aerial and space domains there has been added an additional domain – the cybernetic domain.

Cyber attacks are very common and are perpetrated by diverse entities against a variety of organizations and systems and at all levels.[1] The attacks are perpetrated against state entities and government ministries, military entities, public and municipal infrastructures (such as electricity generation, water conveyance, municipal traffic light systems and toll roads) and also against private targets such as banks, commercial companies and private individuals.

Cyber attacks are conducted by terrorist organizations, hostile states, political activists (such as anarchist organizations and hackers) and of course by criminal elements for economic gain. Targets of the attacks may be varied and diverse; damaging or disabling computer systems, gathering information, gaining control of the computer system for ransom purposes or for the sake of perpetrating another attack in the future and in order to harm national infrastructures or public order and morale.

The means of attack are also varied and they include use of diverse transmission and infection technologies and/or use of the human factor for the purpose of inserting the software or the malicious code into the information or communication systems under attack.

In this context, the vulnerability of the port and shipping sector to cyber attacks is immense. The consequences of such an attack could be significant at a national level and accordingly it is necessary to specifically address this issue within the framework of the overall maritime strategy of Israel.

The efficacy of the ports and the quality of the vital service that they provide depend entirely on the quality of the communication, the logistics and the information systems and the technology being implemented by the port. Among these systems can be noted: perimeter defense and security systems, systems for container management and routing and for pinpointing their location, systems for

1 SYMANTECH, 2016 Internet Security Threat Report; https://www.symantec.com/security-center/threat-report

crane and derrick management, ERP systems for budget, inventory and personnel management, safety systems for communication between the ships and the ports, etc.

The shipping sector also has significant computing requirements. The ships (both the merchant ships and the passenger ships) are being built increasing larger and their operation is based entirely on advanced computing systems, such as navigation and detection systems, buoyancy control systems, loading and unloading management systems, mechanical system control (engine, generator, steering), docking systems, etc.

The growing reliance on communication (satellite and internet) based advanced computing technologies creates susceptibility of the port and shipping world to a new kind of threat; cyber attacks against ports and maritime platforms.

Ports of Israel

The seaports of Israel are classified as critical infrastructure and they constitute the "oxygen line" of Israel. Approximately 98% of the volume of the cargo traffic to and from Israel passes through the seaports, which serve, in addition, also as a key link in the logistics chain of international commerce in the east Mediterranean region.

Modern ports and accessibility to international shipping constitute a vital layer in the Israeli economy and this due to the heavy dependence of the Israeli economy on food imports (a majority of the grains consumption in Israel), energy imports (all the crude oil) and imports of raw materials for the economy and for industry. Furthermore, many Israeli industries are dependent on overseas markets, i.e. on exportation. Any damage to the operation of the ports would cause damage to many industries in Israel, such as the Israeli chemical industry, the electronic chip export industry and additional industries.

In Israel there is 'emergency economy' (EE) preparedness, which is regulated, inter alia, under the 'Emergency Labor Services Law'. By definition of the Law, a critical enterprise' is:

> *…The enterprise operates or can be operated for purposes of defense of the State or public safety or for maintaining critical services; as well as any enterprise or part thereof that can be operated for purposes*

of maintaining the economy and whose operations are critical for maintaining necessary supplies or services for the public or for export.

An additional definition of the Law for a 'critical enterprise' is:

…A service that in the Minister's opinion, if interrupted, may, in the specific circumstances, cause great economic harm that affects the economy as a whole.[2]

The Emergency Authority does not publish the list of critical enterprises for reasons of State security, however it is clear that the ports of Israel meet the aforementioned definitions and it is reasonable to assume that they are defined as a critical enterprise and also as an enterprise rendering 'crucial services'.

Also from these emergency definitions we can infer the decisive importance of the ports to the Israeli economy.

Risks

The dramatic developments that have occurred in recent years in communication and information technologies have affected the manner in which state actors and non-state actors operate and will operate within the maritime domain. These technologies have created opportunities, but also challenges for stakeholders in the military sphere and in the commercial sphere and also for stakeholders from the criminal and terrorism world. The sea is an enormous domain where the platforms (whether ships or other platforms) operate at a great distance from the coast; due to the complexity of these activities uninterrupted and continuous information transfer is necessary from the vessels to the coast and back. In the modern maritime domain, computer-based technologies, including guidance, sensor, control, command and communication systems, as well as linkage between the platforms of the vessels and the coastal infrastructures (such as ports) are critical for creating output and increasing efficiency.

Beyond the serious damage to the State economy or to a specific shipping company, damage to key ports or to major actors of the shipping world has the potential of damaging regional and even global trade. The global structure of the shipping industry, just as the reliance on transshipment of containers between worldwide lines and feeder lines create a situation where damage to a particular port or to a

2 Emergency Labor Services Law, 5727-1967, (Amendment No. 1) 1973-5733 (Amendment No. 7) 2008-5768.

particular company may have a global impact. For example, in 2015 27.52 million containers passed solely through the ports of Hamburg, Rotterdam and Antwerp. These containers constitute roughly 8% of the total worldwide goods traffic.[3] In the United States, the Long Beach port alone renders service to approximately 2,000 ships every year, carrying 6.7 million containers, which in turn constitute one fifth of the container traffic in all U.S. ports.[4]

From an analysis of this threat by the insurance companies, the regulators and the merchant navies there emerges the recognition of the fact that if up to now the navies were required to cope with specific incidents of cyber attack on an individual ship, then a broader attack could lead to systemic damage (damage to an entire fleet), with serious implications for global trade and for the environment.

The following is a description of some of the risks that may be caused by cyber attacks on ports, ships and energy rigs:

Economic risks

- Damage up to disabling of work processes at ports and damage to the foreign trade of the state.
- Damage and destruction of mechanical systems of the ships up to damage to the hull itself (hitting a sandbank).
- Damage and destruction of the coastal infrastructures of the port (derricks, docks).
- Economic damage to the insurance companies and indirectly increasing premium payments by the shipping companies and rising costs of international trade.
- Disabling of critical central or regional infrastructure and damage to the global logistics chain.
- Damage to the reputation of the shipping company.
- Disabling of the processes of gas production and gas conveyance from the offshore drilling rigs, which will lead to damage to the economy due to impairment of the energy supply (gas or oil).
- Commercial smuggling that could harm the economy and public safety.

3 ENISA European Network and Information Security Agency.

4 GAO United States Accountability Office.

Environmental risks

- Pollution of the maritime environment by oil or other hazardous substances by gaining control of oil tanker systems and deliberately colliding with a sandbank, or opening drain taps and releasing hazardous substances into the sea.
- Damage to gas rigs or to the maritime pipelines and disruption of the drilling and conveyance processes, which would cause release of hazardous substances into the sea.

Security risks

- Damage to the national robustness of the state by disabling foreign trade for long periods of time and damage to the food and fuel supply to the civilian population and to the military.
- Remote takeover of the navigation systems of a ship and use of the ship itself as a tool for perpetrating an attack, such as 'knocking over' an oil rig or blocking a port (for example, by tampering with the data and erroneous decision making by the command crew of the vessel).
- The maritime aspects of terrorism, such as smuggling explosives and warfare materials, chemical attacks by hazardous substances, etc.
- Smuggling people by sea and illegal immigration.

Cyber attacks against ports and ships are not only a threat. Such attacks have already been perpetrated over the last year and on large scales.[5]

In 2013 a cyber attack was perpetrated on the container loading information systems at the Port of Antwerp, Belgium. For two years drug dealers gained remote control of this system and altered the content of the containers and their destinations, which enabled them to smuggle drugs in enormous quantities into the country.

A cyber attack that was perpetrated on an oil tanker off the coast of Africa caused the tanker to tilt sideways until it was completely disabled.

Somali pirates in the Gulf of Aden hired hackers in order to identify ships carrying valuable cargo, which have minimal security, in order to take control of that ships.

The national shipping company of the Islamic Republic of Iran, 'IRISL' was attacked in 2012. The attack disabled all the logistics information systems that handle control of the container movement and their location. The hackers who infiltrated

5 http://www.gard.no/web/topics/article/21025160/cyber–security

the 'IRISL' computer system deleted all the databases of the company, including the backup systems, so that the company had no recoverability from this incident.

The situation in Israel

The State of Israel is of course preparing for the issue of defense against cyber attacks. IDF, like the rest of the defense establishment, has addressed the issue at a relatively early stage and the handling of the maritime sphere within the defense establishment has been gaining increasing attention.

A 'National Cyber Bureau' has been established in Israel, which aims to improve the protection of the critical national infrastructures and to secure them, if possible, against cyber attacks. The Bureau simultaneously promotes the status of Israel as a center for developing information technologies, while strengthening the cooperation between academia, industry, the private sector, the government ministries and the defense community.[6] The Bureau is responsible, inter alia, for coordinating the guidelines for the ports and for the coastal infrastructures in Israel.

In the civilian sphere, the legal foundation for regulation in the field is the 'Regulation of Security in Public Bodies Law, 5758-1998.[7] The Law prescribes authorities and responsibility for physical security, information security and critical computer system security in various bodies, including all the ports in Israel (both Israel Ports Company ports and Eilat pipeline and Israel Electric Corporation ports and marinas), as well as the shipping, energy and gas companies. Among other things, the law requires the appointment of a 'security officer' in the foregoing bodies, under the guidance of the General Security Services or the police, depending on the body in question. The authority of said officer includes providing professional guidelines on security issues, information security and critical computer system security in each one of the various bodies.[8]

The statistical yearbook published by the Administration for Shipping and Ports (ASP),[9] describes in detail the Administration's duties and the importance of

6 National Cyber Bureau, Prime Minister's Office. http://www.pmo.gov.il/BranchesAndUnits/Cyber/Pages/NationalCyber.aspx

7 Regulation of Security in Public Bodies Law, 5758-1998: https://www.nevo.co.il/law_html/Law01/111M1_001.htm

8 Regulation of Security in Public Bodies Law, 5758-1998. First Schedule Order 5766–2006, Order (No. 2) 5776-2016.

9 ASP Statistical Yearbook for 2015 (published March 2016). http://asp.mot.gov.il/he/abstract

the seaports to the commercial processes of the State of Israel, Among other things, it is written in the yearbook that: "It can be summarized and said that the economic future of the State of Israel largely depends on development of the ports, on creating conditions for competition between the domestic and foreign users thereof and on increasing their efficiency."

On the area of information systems and technologies the following subjects appear:

- Establishment and operation of information systems for shipping and ports.
- Establishment of a national shipping and ports database.
- Uniformity in the computing infrastructures at the ports.
- Regular collection, processing and dissemination of shipping data.

Nonetheless, there is no mention at all of the subject of coping with cyber threats on the information systems and the communication of Israeli ports and Israeli shipping companies, this despite the importance of this subject and the guidelines provided under the law.

The operational and legal structure of the shipping world is highly complex due to the global spread of the shipping lines; the ports and the coastal infrastructures being under the sovereignty of different states (and therefore, their being subject to non-uniform laws, regulation and ordinances); the registration of many ships under flags of convenience, etc. Therefore, in general it is possible to differentiate between three principal levels of analysis: The level of the state and its costal infrastructures; the international level; and the level of the shipping company. These three levels are naturally influenced by one another and sometimes even overlap.

The coastal infrastructure and port level – this is of course national infrastructure under the complete sovereignty of the coastal state, which can also prescribe mandatory cyber regulation for the port. Nonetheless, it should be taken into account that the communication infrastructures of the port must adapt 'and speak' with many ships, which are bound by different standards, depending on their country of registry. Increased rigorousness in the cyber communication sphere could deny the port the ability to communicate with the ships effectively. The regulations prescribed by the coastal state are usually derived from the international requirements in the sphere, which constitute 'minimum requirements'. Nonetheless – just as in the Israeli case on the cyber issue – the state can prescribe stricter and tighter regulation for its coastal infrastructures and ports than the world standard.

In January 2015, the auditing body of the U.S. Congress (Government Accountability Office – GAO) published a report on the subject of cyber in U.S. ports. According to the report, the U.S. ports handle annually cargo valued upwards of $1.3 trillion. All this activity is supported by information and communication systems that are susceptible to cyber attacks. Failures in these systems could harm or disrupt the port activity and including the flow of commerce. The report's recommendations are that the Department of Homeland Security should direct the coast guard to assess the risks pertaining to cyber attacks and use this assessment in order to assist in developing security guidelines for the maritime sector as a whole. Moreover, the report recommends re-establishment of the cyber threat coordination council in this sector.

The international level – currently different states have international commitments to international treaties and to international codes. Furthermore, implicitly or explicitly, each one of the states is committed to an operating practice derived from the requirements of major actors in the sphere, such as the major insurance companies, etc.

Among the major insurance companies growing interest has been noted on the subject of cyber attacks. Once a year, the global insurance company Allianze publishes a report that surveys the losses and the security level of the shipping world around the world. An analysis of the most recent report[10] reveals that the first reference to awareness of the subject was published only in 2013 and that since then there has been no serious progress on the subject. The most recent report defined the cyber world as one of 'the significant threats' to the shipping world and primarily to the navigation systems (GPS), to the command and control systems (Electronic Chart Display – ECDIS) and to the automatic identification systems (Automatic Identification System – AIS). It should be emphasized that the aforementioned systems are linked to the internet world and to the external communication systems and that any damage to them could result in significant financial losses and insurance claims.

Last February, the world shipping association, which represents more than 2,200 ship owners (Baltic and International Maritime Council – BIMCO), published a guidance document for ship owners and their operators under the title The Guidelines on Cyber Security Onboard Ships.[11] The guidelines describe how to

10 http://www.agcs.allianz.com/insights/white-papers-and-case-studies/safety-and-shipping-review-2016/

11 https://www.marad.dot.gov/wp-content/uploads/pdf/Guidelines_on_cyber_security_onboard_ships_version_1-1_Feb2016.pdf

prepare against the new threat. BIMCO claims that understanding of the threat should begin at the senior management level and not remain the province of computer personnel only. The document notes that all the systems on the ship and at the ports that are based on advanced computer technologies are vulnerable to cyber attacks, including the internet networks intended for the well-being of the crew members and of the passengers on passenger ships. Within the report a mapping was made of all the systems and it includes an in-depth analysis of the degree of potential damage that could be caused as a result of damage to them and recommendations on actions that crew members should take in the event that these systems are disabled. The main recommendation of the report is to conduct a risk analysis and to create a disaster recovery plan.

If we take, as a case study, the threat of piracy attacks in the East Africa region, it appears that the stakeholder shipping companies and states have invested vast resources in order to combat the phenomenon. Over time, and with refinement of the piracy activity, the shipping companies and the insurance companies have begun to take precautionary and protective measures in order to reduce and neutralize the risk. The major factor affecting the considerable decline in piracy activity in this region is attributed to activity of the UN international maritime task force, in which twenty two states are members. As stated, guidelines for preventive behavior, for communication and for reporting have been disseminated among the various forces and organizations operating within the domain in the event of an attack. Concurrently, there has been a rise in the number of private security companies providing a local response for the shipping companies. As a result of this extensive activity, the number of piracy attacks in the East Africa region has declined to a negligible level. This example illustrates the discrepancy between providing a response to a real and tangible threat and the cybernetic cyber threat, which is not tangible and therefore the appropriate management resources and budgets are not being invested there, despite the significant danger that it poses.

The shipping company – the decline in the maritime transport costs and the significant erosion of profits in the maritime freight sphere (ZIM for example presented in the most recent reports of 2015 a half-yearly loss of $132 million) have made it economically difficult for the shipping companies to invest in advanced information security technologies and prompt them to take big risks.

Here are a few of the challenges with which the shipping companies are forced to deal in this sphere:

- The life cycle of technological systems and the large number of hardware and software manufacturers for vessels causes rapid obsolescence of the operating systems and this before having to replace all the systems and facilitates hacking into the systems.
- The communication between the ports and the ships is based on an open not encrypted medium, which aims to save the costs of upgrading the systems to encrypted systems.
- Development of the systems and the software at the ports and on the vessels was not done under a 'secure development' concept and now an enormous investment is required in order to implement a conversion to this concept.
- A lack of skilled professionals in the field.

Unlike other areas in the world of ports and shipping, such as shipping safety and environmental protection, there is currently no regulation or clear and mandatory guidelines. Therefore, cyber security is subject to local initiative of the shipping companies without a mandatory national or international directive.

Summary and recommendations

The ports of Israel constitute the oxygen line through which roughly 98% of the volume of goods comes to Israel. Therefore, it is advisable to give consideration to adequate protection against the new cybernetic threat facing the port and shipping sector.

An analysis of the activity in Israel and around the world reveals that the entities involved in the sphere of shipping and ports (states, insurance companies, shipping associations) are aware of the cyber threat issue, but this awareness has not yet reached a maturity with the power to prompt concrete systemic steps that would cope with the threat and this contrary to what has been done in the financial or defense world.

Since the ports of Israel are a critical national infrastructure they must be protected accordingly in order to enable functional continuity. The establishment of an adequate defense array with the power to cope with cyber attacks must be part of a strategic plan that will include the following subjects:

- Determination and validation of the threat reference of the port and shipping array; this topic must be included in the outline of threats to critical infrastructures in the State of Israel.

- A risk assessment for all the systems and work processes in the port and shipping array.
- Ranking of the risks according to their degree of impact on damage to the main work processes at the ports.
- Appointment of a central body that would lead the issue and provide government entities with an analysis of the threats and recommendations for coping with each one of these threats. The body shall have the authority to give mandatory guidelines to ASP.[12]
- Defining mandatory cyber defense standards for all the ports in Israel.
- Conducting annual scheduled attack drills and surprise drills that are to be conducted by a 'red' team of the national cyber authority in order to test the efficacy of the defense.
- Classification of some of the critical information systems of the port array as core systems and development of these core systems under a concept of 'secure development'.
- Encrypting the information that will be defined as classified and of security importance to the state, as well as the communication medium between the ports and the ships.
- Cooperation with states and relevant international shipping associations in order to achieve mutual signature of information transfer agreements.
- Guidance of a national process of creating cyber standardization for the shipping world will be carried out jointly with a group of friendly and relevant states; this guidance will also help the Israeli companies in the sphere.
- This standardization will define the optimal defense response of each ship and the standardization with which it must comply in order to maintain its operational fitness and this similar to procedures that define boating safety.

Since there is continual erosion of the maritime freight prices and a significant decline in profits of the companies, we are witnessing diminishing investment in new technologies, including cyber defense systems, which constitute overhead and do not add to the operational capability of the vessels. The standardization requirement in the sphere may actually come from the side of the insurance companies and the shipping associations, which classify the cyber threat as a significant threat and regard it as a high risk component.

12 The Haifa Center for Maritime Strategy will assist the entity to be determined in analyzing the threats and recommendations with respect to solutions.

Recommendations:

- Performance of a risk analysis for the computing and operations systems and creation of a functional continuity plan during failure in one of these systems.
- Analysis of the work processes of the vessels while sailing and primarily at the port and this in order to identify primary potential failure points that would enable cyber hacking (such as the remote maintenance process of such system or another on the ship, container loading and unloading processes and so on).
- Mapping of all the systems, in terms of the software and hardware versions, and receiving security updates from the manufacturers.
- Analysis of all the means of communication that the ship has at sea and in port and establishment of an appropriate defense response (such as encryption of the communication medium, blocking devices, etc.)
- Training, exercising and drilling of the ship crew, starting from the level of awareness of the cyber threat (for example, refraining from insertion of external devices, connection between network types, proper work on the internet) and up to modes of conduct when a cyber threat is identified and the ways to contain such incident.
- Creation of a security envelope for the crew members on the ship, which includes individual inspections for key personnel that have access to sensitive systems damage to which could have disastrous consequences.

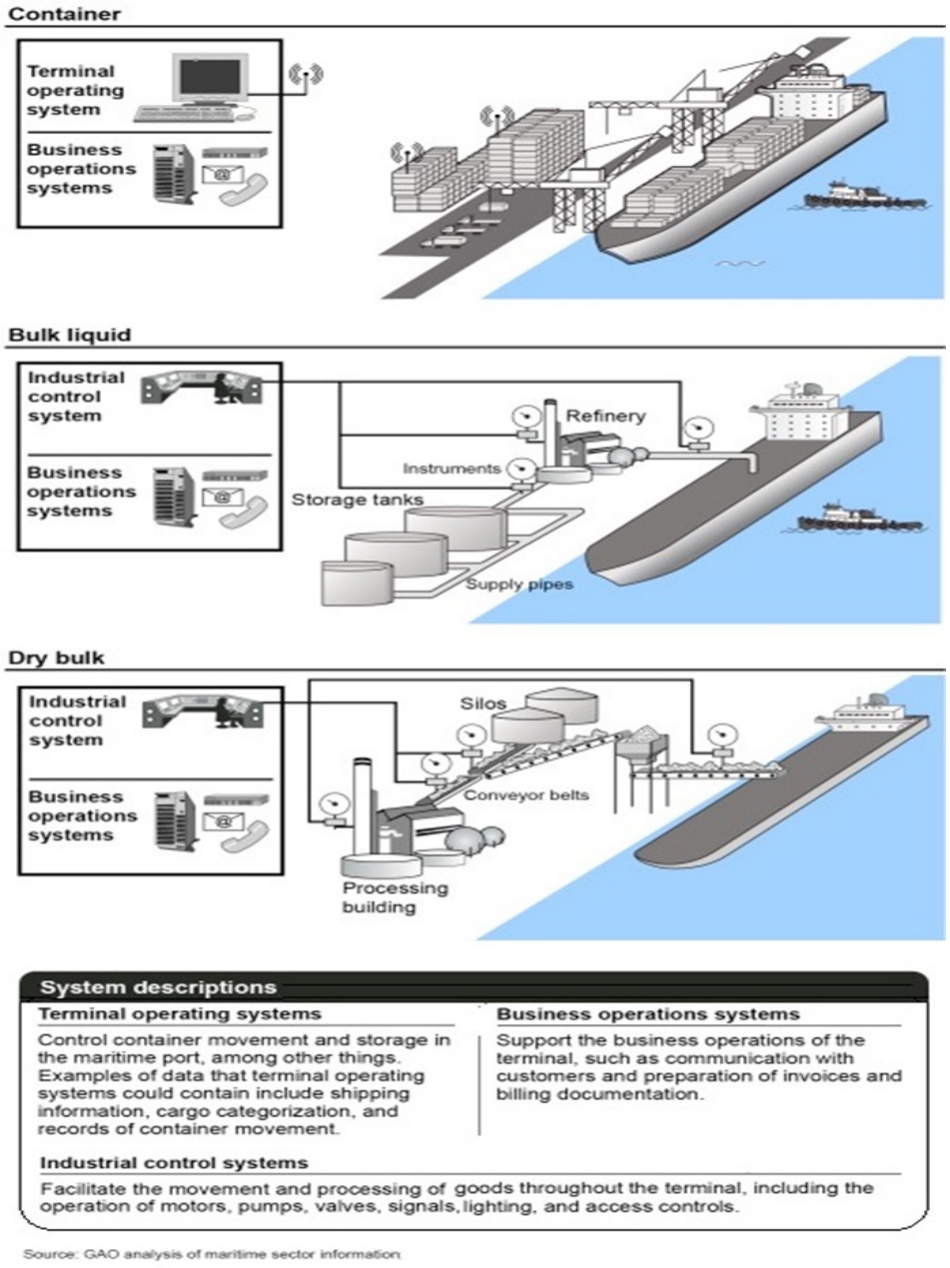

Figure 7.1 Computerized systems for communication between ship and dock

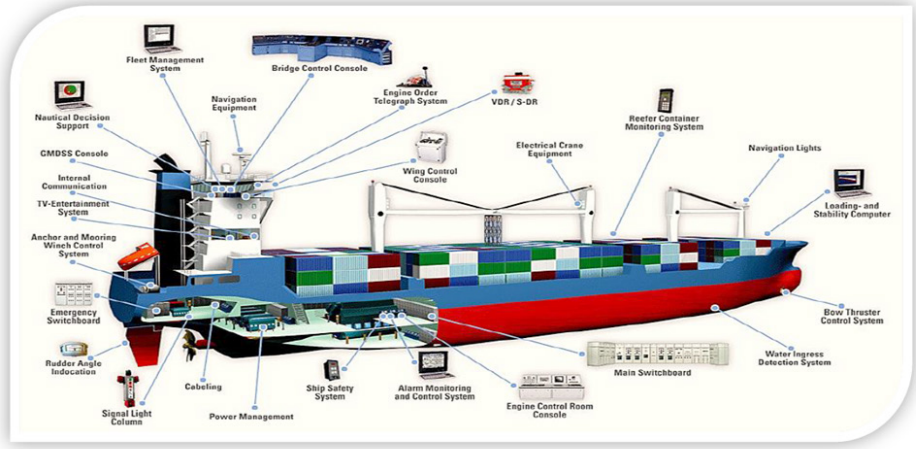

Figure 7.2 Computer-based ship systems

Figure 7.3 Port information systems

Chapter 8: Building the Israeli naval force against terrorist and other threats

Oded Gour Lavie

Historical overview

The maritime threats against Israel have changed in nature and form since the establishment of the State and consequently also the response given to them by the navy has changed.

Beginning in the 1960s and the early 1970s, the threat to Israel in the maritime domain proceeded to develop concurrently with the cold war between the superpowers. During those years, the most significant maritime threat to Israel was from the fleets of the Arab countries, which were equipped with weapon systems (missiles, radar and electronic systems) of the Soviet industry. The building of the Israeli maritime force during that period was devoted to technological advancement and the development of military tactics (MT) in order to deal with the Syrian army and the Egyptian army and this concurrently with the regional arms race, which was influenced and supported by the superpowers: The Soviet Union and the United States. During those years, Israel developed methods of electronic warfare against the enemy missiles and succeeded to overcome the problem of the discrepancies in the firing range of the missiles, which during that period favored the Russian missiles that were used by the Arab countries.

The threat of the Arab armies culminated in the Yom Kippur War (1973). The navy missile boats (SA'AR Boats) entered the campaign while they were equipped with 'Gabriel' missiles manufactured by Israel Aerospace Industries. Over the course of the war the first sea to sea missile battle in maritime history took place and the Israeli navy emerged from the battle with the upper hand as having gained full control of the maritime arena, maintained open sea routes to Israel and struck multiple war ships of the enemy and all this without harm to life or to ships.

In the course of the 1970s there was a strengthening of the Palestinian terrorist organizations and a terrorist threat from the sea began to develop, primarily infiltration and attack capabilities from the sea, some of which, unfortunately, even succeeded.1 These terrorist threats occurred concurrently with the decline in the threat of the fleets of the Arab countries, primarily following signature of

1 Nahariya 1974, Blood Bus 1978, Nahariya 1979, Nitzanim 1990

the peace agreement with Egypt. The terrorist threat required IDF as a whole and the navy in particular, to develop new capabilities, and including defense of the coasts by means of advanced detection systems and new and faster vessels for patrol and routine security measures, instead of the relatively old American made 'Daboor' class vessels on which the navy had relied until then.

In the course of the 1980s and 1990s there were signs of a continued decline in the threat of the fleets of Arab countries, but the collapse of the Soviet Union led Egypt to replace its patron superpower and to acquire new vessels and advanced western capabilities that demanded Israeli surveillance and attention. The Syrian fleet, in contrast, does not constitute a real military threat against the capabilities of the Israeli navy.

In the course of the 1990s 'Sa'ar 5' class missile boats came into operational service in the navy, with the capability of carrying a helicopter, as well as greater evasion and survivability capabilities. At the end of this period also came the 'Dolphin' submarines, which significantly strengthened the strategic capability of the maritime branch.

Following the IDF's withdrawal from the security zone in South Lebanon, a significant strengthening of Hezbollah took place on all levels and including on the maritime front. The culmination of this strengthening came in the course of the Second Lebanon War (2006), with the launching of C-802 class coast to sea missiles that struck the 'Sa'ar 5' class 'Hanit' ship of the navy and a civilian Egyptian ship. Today, Hezbollah has advanced maritime capabilities, which comprise hundreds of coast to sea missiles (more than the number of missiles that Syria had in the 1970s).

The present threats and challenges and building the maritime force against them

Defense of the Exclusive Economic Zone of Israel (EEZ)

The discovery of the 'Noa' natural gas reservoir in 1999 and immediately thereafter the discovery of the 'Mari' reservoir in 2000 marked a new era in the Israeli energy economy, but also posed new defense challenges to the navy. Defense of the economic water domain of Israel constitutes a challenge both due to the size of the EEZ maritime domain, which is larger than the territory of the entire State of Israel, and also due to the nature of the activity involved in the exploration and production of the gas. The drilling installations are civilian installations, which by nature are

not equipped with self-defense capability. These are very expensive installations located at a fixed site over long periods, far from the coast and from the naval bases. Damage to these installations constitutes strategic damage to the State (due to damage to the energy market, which is critical to conducting normal life). Therefore these installation may be used 'as a quality target' for terrorist attacks.[2]

The State of Israel arranged to defend the gas rigs using a number of levels of defense, beginning with local defense of the rigs and up to formulation of a concept for the defense of the maritime-exclusive economic zone in part by the acquisition of corvettes[3] and additional resources for the Israeli Navy that would facilitate better defense and response capability.

It should be noted that there is a conceptual dispute with respect to the best manner of defense. Some claim that large and specialized vessels are the best way to defend the economic waters of Israel, while others claim that smaller and more flexible vessels are preferable. When examining the building of the maritime force from a long term perspective in a dynamic environment, such as the one that exists in the Eastern Mediterranean Sea, it is necessary to weigh between advancement in the response capability to a specific challenge and creation of potential for new future capabilities. It is important to note that given the scope of the general limited force of the navy, versatile tools, which could carry out more than one mission and thereby facilitate better utilization of IDF and Naval resources, are important.

In May 2015, it was reported that Israel and Germany signed an agreement for the purchase of 4 corvettes; the transaction amount is set at NIS 1.8 billion, where one third of the deal is to be funded by the government of Germany. The first ship is supposed to arrive in Israel in the course of 2020. Proper deployment is necessary for receiving the corvettes and including training of personnel, installation of systems, construction of port infrastructure and formulation of military tactics. Moreover, it should be ensured that Israel has the ability to maintain and to repair the corvettes in order to maintain their operational capability. To this end, skilled technical personnel are required in the naval shipyards and in the relevant special staff branches.

2 For a comprehensive overview of the maritime threats to the energy economy: Nir Zarchi, *Designing Energy Policy Tools for Coping with Security Threats to Maritime Energy Installations – Studying the Case of the Maritime Gas Infrastructure of the State of Israel*.

3 Corvette: Fast vessel with high maneuverability, usually armed with medium range sea to sea missiles, canons and anti-submarine and anti-aircraft combat measures. Corvettes have transport displacement ranging between 550 to 2,800 tons and transport length ranging between 55 to 100 meters.

Coast to sea missile threat

The last decade constituted a turning point in the understanding of this threat. Hezbollah is perhaps defined as a terrorist organization, but this non-state organization holds a very large quantity of advanced weapons including more advanced capabilities than most state armies in the region in all matters pertaining to detection, radar and coast to sea missile capabilities, which include hundreds of missiles. As stated, Hezbollah today holds more missiles than the number of missiles that were held by the Syrian army in the 1970s, the eve of outbreak of the Yom Kippur War.

The building of a force against this threat is characterized by intelligence activity, electronic warfare measures and anti-ballistic missile defense systems for defending the ships and their vicinity. It should be kept in mind that the threat is not directed towards the Israeli fleet alone and it constitutes a threat to all vessels in the domain.

The Palestinian arena and terror from the sea

Hamas continues with the buildup efforts in the Gaza Strip and including attempts to acquire maritime capabilities. Encouraged by its success in infiltrating the territory of Israel in the Zikim region in the course of Operation Protective Edge (on the first day of the fighting, 8.7.14) Hamas continues in the smuggling efforts of maritime warfare equipment, diving equipment and so forth for the purpose of building naval commando warfare capabilities.

Building the force against this threat is characterized by routine security activity, intelligence and cooperation with other IDF branches, as well as introducing varied technologies that are relevant both to this arena and to the northern border region of Israel.

The navy is responsible for the naval – security blockade on the Gaza Strip and including implementation of security surveillance of vessel movement (mainly fishermen / smugglers) from the Strip. The fishing sector in the Gaza Strip has been restricted in the past to a range of 6 nautical miles. In October 2016, it was reported that the defense establishment would expand the fishing area permitted to the Palestinians in the Gaza Strip to nine nautical miles for two months (the winter months constitute the peak of the fishing season). The expansion will only be in the southern part of the Strip.

Every once in a while an issue emerges in the media of a Gaza 'aid flotilla' belonging to Palestinian organizations and international organizations. Subsequent to the flotilla incidents of 2010 (Mavi Marmara Flotilla) which indeed failed to reach the shores of Gaza, but did have enormous and negative international repercussions against Israel, there were several attempts to break the security blockade by civilian flotillas. In the beginning of October 2016, an additional flotilla was stopped on its way to Gaza, 'the Women's Flotilla' or 'Zaytuna Flotilla' (named after the flagship of the flotilla).

These flotillas pose operational challenges for IDF and the navy of gaining control of civilian ships. In contrast with the IDF ground forces that since the First Intifada (1987) are accustomed to friction with civilian populations, these flotillas are the first time that the IDF naval forces have encountered friction with a hostile civilian population (as opposed to routine searches and inspections of civilian vessels).

Moreover, the flotillas constitute part of a broader political and legal campaign against Israel, within the framework of which various terrorist organizations benefit from an asymmetric situation where they (as opposed to the State of Israel) are not actually governed and do not take responsibility under international law. This situation poses a special challenge with regard to media coverage around the world. Moreover, these flotillas divert resources, and primarily command resources, from other challenges that the navy faces.

SSR and SSM[4] against naval bases and against martime infrastructures

Already since the days of the First Gulf War (1991), missiles and rockets have been fired on strategic targets in Israel (factories, national infrastructures); this in addition to attempts to harm urban population concentrations. The terrorist organizations have marked these as targets for strategic objectives, such as the Haifa Bay Perto-industry complex, and the Hezbollah leader, Hasan Nasrullah, even declared that the ammonia tank in Haifa Bay is a legitimate target for the Hezbollah missiles.[5]

In the course of 'Operation Protective Edge' (2014), a large number of rockets were fired from Gaza towards strategic targets such as the 'Rutenberg' power station in Ashkelon and the Port of Ashdod in an attempt to disrupt regular life, commerce and the economy and to damage the energy infrastructures of Israel.

4 SSR and SSM: surface to surface rockets, surface to surface missiles.

5 To view the threat speech at ynet: http://www.ynet.co.il/articles/0,7340,L-4767157,00.html

The naval bases that are located within the Port of Haifa and the Port of Ashdod constitute an additional target for those rockets and missiles.

The clear advantage of the navy and of the vessels is the ability to preserve the force by evacuating the ports and going out to the open sea and thereby stopping the threat from these rockets without requiring special protection. However, the coastal base of the navy, which is used for techno-logistical backup, could be damaged thereby making it difficult to re-arm the vessels and to deal with breakdown incidents.

Building the submarine forces

The State of Israel decided to build and operate a submarine force that consists of 6 submarines. This size of force enables high operational availability of 2–3 submarines.

In order to maintain this size of force operationally it is necessary to replace 'Dolphin' submarines that were manufactured in the 1990s of the previous century and are nearing the end of their lives in the mid-20s of the present century. To this end, it is necessary to commence the building of three new submarines, which will gradually replace the old submarines in about another decade. As stated, a project of such magnitude requires about a decade due to the need to precisely configure and plan the new vessel. We must also bear in mind that we cannot purchase an old model of submarines again, since their production lines no longer exist. Furthermore, the old technology is no longer in use and many modifications and alterations are needed. It is also important that the submarines that are purchased by the state will have a certain similarity and a certain compatibility with the existing submarines. Therefore, the further building in the German shipyards will presumably address these requirements (and this in addition, of course, to the special relationship that exists between Germany and Israel from the days of Ben Gurion).

The maritime flanking option

The operating concept of the IDF naval forces has adopted the motto of participation in the ground campaign and in the IDF victory. For this reason, the cooperation between the navy and other IDF forces has intensified, which is manifested in resources, exercises, planning and force building.

There is no doubt that integration between sea and ground forces (as was already done in the Shlom Hagalil War in 1982: Real time intelligence and primarily by landing the paratrooper forces in the Awali Estuary), has proven itself and created

a turnaround that impacted the ground battle. The navy made extensive use of its maritime transportation capability and provided a response for emerging difficulties in the ground campaign. Looking ahead, and with the understanding that in the future campaigns the challenges against the enemy will be more complex and more intertwined with civilian environment, tunnels and numerous land obstacles, there is no doubt that integrating the maritime flanking option to attain various objectives constitutes a major ground force multiplier.

Threat of the fleets of arab countries

The direct threat from the fleets of Arab countries is at the bottom of the present threat scale. Syria is in the midst of an internal war that has eroded its military. In many parts of the country chaos prevails. The fleet and the navy still exist, but only at the most basic level of functioning. The key threat in the Syrian arena is from capabilities of firing 'Yakhont' (P-800 Oniks) class coast to sea missiles manufactured by Russia, which the Syrian fleet possesses.

The Lebanese fleet is primarily used for guarding coasts and for defense near the shores of Lebanon.

In recent decades, the fleets of Egypt and of Saudi Arabia have undergone modernization and were upgraded to western platforms,[6] however the peace agreement with Egypt and the common interests between Israel and the Sunni-Islamic countries leads to the conclusion that a threat of these fleets to Israel and to the navy will remain very low also in the foreseeable future.

Unmanned vessels

The navy has made attempts and in recent years has even used unmanned vessels to carry out patrols and for defense of territory. The process is extremely slow and the capabilities of the unmanned vessels are still very far from the capabilities of unmanned aircraft, both in terms of the perception of employing the force and from a technological perspective.

Nonetheless, building a force and developing unmanned maritime capabilities are a necessity against the reality that we face. There is no doubt that this field will develop in the future and that the maritime force based on unmanned vessels will grow. Development of these vessels and effective use of them will save resources, produce new capabilities and offer a solution to some of the challenges listed above.

6 See details in the chapter 'The Red Sea and the Persian Gulf and Influences from the Direction of the Indian Ocean'.

Chapter 9: The geopolitical aspects of the gas reserves in the economic waters of Israel

Eyal Hayut-Man and Elai Rettig

The chapter is based on a joint-committee report of the Hudson Institute (Washington, U.S.A.) and the University of Haifa prepared by Mr. Eyal Hayut-Man, the committee coordinator on the Israeli side. Additions and updates: Mr. Elai Rettig

General

The discovery of two large offshore gas fields – Tamar in 2009 and Leviathan in 2010 – is having a major impact on the State of Israel on three key interconnected levels: Energy security, economic development, and the reinforced geopolitical status of Israel as a gas exporter.

Energy security: Ostensibly, a country's concern for its energy security should be the first and most important aspect of decision makers when devising a long-term energy policy. In practice, although energy security concerns had accompanied the State of Israel since its establishment, in the last decades, as well as in times of crisis and war, an energy shortage has not been felt in Israel.[1] Moreover, Israel imports crude oil for refinement and export of oil distillates on a scale that greatly exceeds the consumption of the local market, indicating that there is no significant problem involving the import of crude oil to Israel in large quantities. Nonetheless, energy security interests, which require long term assurance of an inexpensive, local and available energy source (after many decades of total dependence on importation from other countries) – remains central as far as Israel is concerned.

Economic development: The development of the economy, which coincides with development of the gas fields, stems mainly from the use of an energy source whose present and predicted price is lower for the Israeli economy compared to the use of other energy sources (primarily for electricity production, industry and transportation). This fact has a direct effect on the cost of living and production in Israel, as it contributes to the competitiveness of the export industries by lowering production prices compared to international markets. Furthermore, the transition

1 Incidents such as terrorist attacks on the gas transport infrastructure from Egypt (2011) or the Second Lebanon War (2006 led to a change in the fuel mix used for industry and electricity, which resulted in rising prices. Nonetheless, an energy shortage was not felt by the public.

to natural gas lowers costs related to air pollution caused by the use of coal and oil distillates (primarily in the public health sphere). Beyond the economic development stemming from the domestic use of local gas, the gas discoveries will increase foreign currency income as a result of their export, which will enable in turn an increase of exportation and development of additional infrastructure for the domestic economy. Furthermore, in recent years a new industrial branch has been developing in Israel focusing on energy technologies which better utilize the use of natural-gas.

Geopolitical status: Energy exports (gas in the Israeli case) are not only an economic good, but a tool of strategic significance. This is true both for the country importing the gas (which requires stability and reliability of supply) and for the exporting country, which gains significant pressure leverages over the importing countries. Nonetheless, these leverages can be a double-edged sword and work against the exporting country. This may happen if the exporter develops economic dependence on a limited number of customers who have other suppliers available for them, and can thus threaten to sever trade relations and use other alternatives. Therefore, mindful and prudent planning of the country's gas export policy is vitally important in determining the geopolitical influence that it is likely to have. We can note as an extreme example the Russian energy export policy, which constitutes a direct continuation of the Russian foreign policy. There are even those who cynically claim that Gazprom (the largest gas and oil exporter in Russia) has replaced the Red Army as a tool for achieving the objectives of the Russian foreign policy.[2]

The importance of setting a structured policy for gas exports

Notwithstanding the relatively modest amount of gas available to Israel for export purposes, proper use of this amount can yield positive geopolitical results. A proper gas export policy can assist in strengthening countries with a common interest to Israel (such as Jordan and Egypt), assuage rivals (Turkey), strengthen Israel's status in Europe by satisfying part of its increasing energy consumption, and even strengthen Israel's international status by exporting gas to distant markets such as the Asian market. Due to the limited quantity of the gas for export and the high cost of establishing infrastructure for the advancement of any objective, Israel will need to select and prioritize specific objectives. This prioritizing will be done by formulating a well-organized export policy.

2 Kari Liuhto: Energy in Russia's foreign policy

Gas exportation is perceived by Israeli decision makers as a source of security stability and as a catalyst for regional economic cooperation, which would highlight the necessity and the contribution of Israel to its region. This interest was particularly heightened in light of the perceived distancing of the United States from the Middle East region in recent years. Furthermore, exportation of gas to European countries is perceived by decision makers as a component in the battle against the possibility of economic boycott against Israel. The Government of Israel believes that exporting gas to Greece, Cyprus, Italy, and to additional EU member countries could help in preventing any initiatives for economic sanctions by the European Union since sanctions require a unanimous consensus. Nonetheless, it should be noted that this assumption is inconsistent with the relatively small quantity of gas that Israel would be able to supply to European countries, if it indeed chooses to do so, and that past events indicate that the exportation of energy does not prevent the imposition of sanctions on the exporting country (e.g. Russia, Iran, Iraq, Libya, Nigeria, Sudan, South Africa).

The relationship between the economic development stemming from the gas fields and exportation of the gas is complex and comprises multiple political, economic and technological variables, which interact and impact each other in a variety of channels. In developing its energy resources, Israel should promote a policy that balances between different considerations – on the one hand to ensure that the public will benefit from the development of the gas fields through royalties from exports, to guarantee a sufficient quantity of gas for internal consumption, to maintain a competitive price in the domestic market and to protect the environment. On the other hand, it should ensure that the projects are sufficiently attractive for entrepreneurs in terms of profit potential in order to guarantee that the existing gas fields are indeed developed and to attract new entrepreneurs who will explore additional reservoirs. Furthermore, Israel must make use of the gas resources in order to achieve regional stability and promote its strategic interests in the region.

The current situation

According to geological estimates, the Tamar and Leviathan reservoirs collectively can supply gas to the local market for the next 30 years and still allow significant gas exports (40% of the total gas quantity, according to the resolution of the Government of Israel in accordance with recommendations of the Zemach

Committee).[3] According to estimates of the Bank of Israel from December 2015, the profits to the State from taxes and from royalties may reach, during this period, up to roughly 69-100 billion dollars.[4]

It cannot be determined with certainty what quantity of gas is contained in the two reservoirs and there is a dispute between experts of the gas companies and experts from the Ministry of Energy and Water Resources. According to these contrasting estimates, the Tamar reservoir contains between 246 and 280 billion cubic meters of gas, whereas the Leviathan reservoir contains between 470 and 620 billion cm. These differences, which reach up to 25% in the case of the Leviathan field, could affect the export options of Israel. Additional, smaller, reservoirs found include 'Karish' and 'Tanin' (approximately 55 billion cm collectively), as well as the 'Dalit' reservoir (approximately 8 billion cm).[5] Furthermore, there are estimates of additional oil reservoirs under the gas fields, but exploring these reservoirs would require further investment.

The most significant development over the last year in the Israeli gas economy was the approval of the framework agreement between the government and the gas companies 'Noble Energy' and 'Delek' for the development of the Tamar field and the Leviathan field. While the Tamar reservoir has been connected since 2013 to the Israeli coast via a pipeline and provides roughly 45% of the electricity consumption of the Israeli economy (as of mid-2016[6]), the development of the Leviathan reservoir was delayed since it required a final agreement between the production companies and the government. This framework agreement was approved on the 17th of December 2015 and included compromises and arrangements on a range of

3 The Prime Minister's Office, "Adoption of the Main Recommendations of the Committee for Examining the Government's Policy Regarding the Natural Gas Economy in Israel (Zemach Committee Report)". Resolution Number 442 of the 33rd Government, headed by Benjamin Netanyahu (23.06.2013). http://www.pmo.gov.il/Secretary/GovDecisions/2013/Pages/des442.aspx

4 Bank of Israel, *"Bank of Israel's comments to the draft outline with regard to development of the gas fields discovered in the economic waters of Israel"* (1.12.2015), pg, 9.

5 Ministry of National Infrastructure, Energy and Water Resources, "Israeli Gas Opportunities" (March 2016). http://energy.gov.il/Subjects/OilSearch/documents/israeli%20gas%20opportunitties.pdf

6 Israel Electric Corporation, "Quarterly Report for the Three and Six Month Periods Ended June 30, 2016" (July 2016), pg. 5. https://www.iec.co.il/investors/DocLib1/meshulav062016.pdf

topics, among them taxes, anti-trust, export and environmental considerations.[7] The most significant clause in the agreement required the gas companies to relinquish their holdings in the Karish and Tanin reservoirs and sell them to an external company, while reserving the gas to be produced from these fields to the local economy as an alternative to Tamar and Leviathan. The framework agreement was initially invalidated by the Supreme Court on the 27th of March 2016, concluding that the government does not have authority to commit to a 'regulatory stability clause' for 10 years, which was one of the conditions set in the agreement designed to ease the concerns of the gas companies that the next government may revoke the framework. Nonetheless the Ministry of Energy and the gas companies announced the signing of a revised framework agreement on the 18th of May 2016, in which a tempered version of the regulatory stability clause appeared And the agreement was approved by the government.[8] Concurrently, at the beginning of 2016, the Minister of Infrastructure, Energy and Water Resources approved the Leviathan development plan.[9] The signing of a final agreement, as well as the ability of the gas companies to present contractual agreements with potential customers is imperative to raise financing for the project. By the end of 2016 'Noble Energy' is scheduled to make a final investment decision (FID) with respect to the reservoir.

Another significant development occurred in August 2016, when 'Energean', a Greek energy company registered in Cyprus, announced that it would purchase the 'Karish' field and the 'Tanin' field from the gas companies in a deal worth about an estimated $148 million.[10] Energean had previously been active in the Israeli gas

7 The Prime Minister's Office, "Outline for Increasing the Quantity of Natural Gas Produced from the "Tamar" Natural Gas Field and Rapid Development of the "Leviathan", "Karish" and "Tanin" Natural Gas Fields and Additional Natural Gas Fields". Resolution Number 476 of the 34th Government, headed by Benjamin Netanyahu (16.8.2015). http://www.pmo.gov.il/Secretary/GovDecisions/2015/Pages/dec476.aspx

8 The Prime Minister's Office, "Amendment of the Outline for Increasing the Quantity of Natural Gas Produced from the "Tamar" Natural Gas Field and Rapid Development of the "Leviathan", "Karish" and "Tanin" Natural Gas Fields and Additional Natural Gas Fields". Resolution Number 1465 of the 34th Government, headed by Benjamin Netanyahu (16.8.2015). http://www.pmo.gov.il/Secretary/GovDecisions/2016/Pages/dec1465.aspx

9 The Ministry of Infrastructures, Energy and Water Resources, "Speaker message: The Ministry of Infrastructures, Energy and Water Resources has today approved the development plan of the Leviathan Partnerships for I/14 Leviathan South and for I/15 Leviathan North holdings" (June 2, 2016). http://energy.gov.il/AboutTheOffice/SpeakerMessages/Pages/GxmsMniSpokesmanOSJune16.aspx

10 Lior Gutman, "The Greek Energean Acquires the Karish and Tanin Gas Reservoirs", Calcalist (16.8.2016). http://www.calcalist.co.il/local/articles/0,7340,L-3695800,00.html

industry in the (failed) 'Sara' and "Mira' exploration licenses and it has experience in developing fields in Greece and in Egypt. Nonetheless, the company's ability to develop the Karish and Tanin reservoirs and compete in the local Israeli gas market against much larger reservoirs requires the provision of significant government incentives that have not yet been established. These incentives could include benefits to factories that choose to connect to gas from the smaller reservoirs, subsidizing the transmission system between the reservoir and the mainland, and reserving the gas to specific sectors in the economy, such as agriculture.

Meanwhile, important developments in the global energy markets significantly reduced energy prices and hindered financing of the projects. There are a few key reasons for the drop in energy prices over the course of the last two years: A glut in global supply of oil and gas in the wake of increased OPEC and Saudi output (among other reasons, as part of the struggle between Saudi-Arabia and Iran); the entry of new technologies (renewable energies and the rise of shale oil and gas in the United States); development of new oil and gas fields (in Australia and in the Caspian Sea); the rise in oil output among non-OPEC countries (Canada, Russia, etc.); and the slowing rise in demand from Asia, primarily due to the slowdown in the Chinese economy.

In addition, the European market, which is a key energy market in the region, has been undergoing changes which include an increase in consumption of gas provided by pipelines as opposed to liquefied gas. Greater competition for the European market is soon expected with the completion of a new pipeline from the Caspian Sea (Southern Gas Corridor) and additional sources overseas. Russia as a key gas supplier to Europe is already now lowering prices in order to maintain its market share.

Falling world energy prices has therefore caused development of new gas reservoirs to be less profitable and has diminished the economic power of the gas companies.

Notwithstanding the aforesaid, development of the gas reservoirs and exploration of additional reservoirs has remained a long-term strategic interest of Israel. The State is aware of this and over the last few months it has implemented several steps in order to further this interest. In an effort to attract new entrepreneurs, In August 2016, the Ministry of Energy approved, after four years during which the sea was closed to exploration, a re-opening of license distribution for oil

and gas exploration zones in the economic waters of Israel.[11] Furthermore, the State is attempting to encourage factories and consumers to connect to the gas infrastructure in order to increase the local demand and make the market more attractive for external entrepreneurs. Nonetheless, in many cases regulatory and technical barriers came to light that did not enable these connections.[12] In order to encourage regional collaborations, the government promoted, inter alia, trade agreements and political agreements with Jordan and Turkey and held a number of highly publicized meetings with senior officials from Greece and from Cyprus.[13]

Potential export destinations

The question of how and where the gas that has already been discovered should be exported is a critical issue in the decision making of the State of Israel. Exportation of the gas is essential in order to ensure the economic viability of developing the gas fields in Israel and it has the power to yield significant economic, political and strategic gains. Neighboring countries – Jordan and Egypt – and the Palestinian Authority, as well as more distant countries such as Turkey, Cyprus and Greece, may benefit from Israeli gas. Nonetheless, the decision of where to export is also fraught with political and economic challenges, among them the impact of such export on Israel-Turkey-Greece relations, the opposition of the local populations in some of the destination countries and the various technical challenges. The dispute with regard to the quantity of gas in the Leviathan reservoir (470-620 BCM) could also play a significant role. If the lowest estimate is correct, presumably the gas for export to Egypt, Greece and Turkey (the three primary candidates to become the largest customers of Israeli gas) will not be significant. In such case, Israel will have to prioritize one destination over the other according to various considerations.

11 The Ministry of Infrastructures, Energy and Water Resources, "Speaker Message: Minister Steinitz promotes re-opening the sea: The new oil and gas exploration zones in the economic waters of Israel were approved today by the Petroleum Council". Ministry of Energy website (10.8.2016). http://energy.gov.il/AboutTheOffice/SpeakerMessages/Pages/GxmsMniSpokesmanOSAug16.aspx

12 The Ministry of Infrastructures, Energy and Water Resources, "Speaker Message: The Natural Gas Authority of the Ministry of Infrastructures, Energy and Water Resources held a conference to encourage consumers in Haifa and in the North to connect to natural gas". Ministry of Energy website (12.9.2016) http://energy.gov.il/AboutTheOffice/SpeakerMessages/Pages/GxmsMniSpokesmanNGHaifa.aspx

13 Arye Mekel, "Israel-Greece-Cyprus Summit: A New Geopolitical Bloc is Born". *Haaretz* (31.1.2016) http://www.haaretz.co.il/news/world/middle-east/.premium-1.2834779

Jordan

Jordan needs a supply of natural gas due to the increasing demand in the local economy and the shortage of gas that it imports from Egypt. Cooperation with Israel in this sphere could help the economy and the political stability of Jordan. Notwithstanding existing plans to import liquefied gas from Qatar, the alternative of importing dry gas by pipeline will always be preferable for Jordan, both in terms of the stability of the supply and in terms of price. Consequently, Israeli and Egyptian gas has a significant advantage over other alternatives for Jordan's needs. And indeed, in September 2016, the Leviathan reservoir partnership announced that it had signed a contract for the supply of 45 BCM of natural gas to Jordan's National Electric Power Company (NEPCO) over 15 years at a cost of 10 billion dollars. Due to various political considerations, among them opposition of the Jordanian street to the deal with Israel, the sale of the gas will be made via a third-party marketing company that will not be registered in Israel.[14] This solution may also be used by Israel in other future deals. The signature of the agreement significantly increases the chance that 'Noble Energy' will approve the final investment decision on the Leviathan reservoir and that the reservoir will be developed on schedule. The gas deal also necessitates construction of an onshore pipeline that may also pass through Palestinian Authority territories and be used to supply gas to the Authority.

Egypt

Although Egypt currently suffers from a severe shortage in natural gas needed to meet the demands of its domestic economy, the large offshore gas field it discovered in August 2015 ('Zohar' field) may certainly allow it to satisfy these growing needs over the coming years. However, development of the field is expected to be a lengthy process in the course of which Egypt may still need Israeli gas. Furthermore, the gas liquefaction installations in Egypt have been underutilized over the past few years and could be used by Israel for export. It is still unclear whether the new field in Egypt will suffice for both the needs of the domestic market and for the full exploitation of these LNG facilities. This fact will affect Israel's long-term plans of targeting Europe and the global gas market as potential export destinations for Israeli gas. These plans also depend on the quantity of existing gas in the Israeli reservoirs, which may not suffice to provide

14 "Huge Agreement: Leviathan Partnerships to Sell Gas to Jordan Estimated at $10 Billion ". *Globes* (26.9.2016). http://www.globes.co.il/news/article.aspx?did=1001154440

gas for both Egypt and Turkey while also leaving viable amounts for significant export to the European and global markets.

Turkey and Europe

The main export options to Europe are through a subsea pipeline or a natural-gas liquefaction installation (LNG). It is technically possible to lay a pipeline that transports the gas to Cyprus, to Turkey or to Greece. While a subsea pipeline to Greece apparently poses significant engineering and financial problems, the option of deploying an Israeli gas pipeline to Turkey has received reinforcement in the wake of the reconciliation agreement that was recently signed between the two countries. Such a pipeline may help Turkey decrease its reliance on Russian gas, particularly given the deterioration in Turkish-Russian relations over the past year. The business sector in Turkey is interested in cooperation with Israel in the energy sphere in addition to other available alternatives, such as purchasing gas from Qatar and from Iran (which is expected to be more expensive than the Israeli gas) and purchasing gas from Azerbaijan, which alone would not satisfy the increasing demand in the Turkish economy. Accordingly, assessments have re-emerged regarding an agreement for the exportation of gas from Israel to Turkey, which would transfer to the Turkish market approximately 8-10 BCM annually.[15] Constructing a pipeline to Turkey would also require cooperation with Cyprus, since it would pass through its exclusive economic zone. While at first it appeared that the agreement raises too much concern among senior officials in Cyprus, it seems that Cyprus will agree to such a deal if it will come to fruition. The development of the 'Aphrodite' field, which was discovered in Cyprus in 2011 and contains approximately 125 billion cm of natural gas, is likely dependent on the development of the Leviathan field. Therefore, cooperation in the energy sphere between Israel and Cyprus is a Cypriot interest. Nonetheless, the construction of the pipeline – as well as the development of the 'Aphrodite' reservoir – is still depend on the ability of Turkey and Cyprus to come to an arrangement despite the tension between the two countries surrounding the natural gas issue and the ownership thereof.[16] An additional issue that should be considered is that adding competition in the gas market in Turkey means a decrease in the price per unit of

15 Hedy Cohen, "Senior gas company officials estimate: By the end of 2017, the gas contract between Israel and Turkey will be signed". *Globes* (27.6.2016). http://www.globes.co.il/news/article.aspx?did=1001135236

16 Michael Emerson; "Fishing for Gas and More in Cypriot Waters". http://file.insightturkey.com/Files/Pdf/insight-turkey-vol_15_no_1_2013_emerson.pdf

gas that the Leviathan partners may demand. Consequently, the profitability of the exports could be less than initial estimates.

Beyond the economic aspect, exportation of Israeli gas to Turkey could help strengthen the relationship between the countries. This is particularly evident in the wake of the reconciliation agreement between Israel and Turkey that was signed in the summer of 2016 and created a common interest in a market of strategic importance. Moreover, the significant costs of laying the gas export infrastructure and the fulfillment of a long term contract may strengthen the interest of the two countries to cooperate, inasmuch as the cost of conflict or of severing the trade would be much greater than in the past. Nonetheless, it should be noted that the economic cost of disconnecting the gas would primarily fall on Israel. Israeli gas would satisfy only about 10% of Turkish consumption and in case of a disruption Turkey could compensate for the loss of Israeli gas from other sources. Israel, on the other hand, would be at a disadvantage, inasmuch as Turkey would be the largest customer of its gas. This asymmetry increases if Israel wishes to use Turkish infrastructure in order to export to the European continent. In such a case, Turkey could, at least theoretically, threaten to disconnect the Israeli gas to Europe alleging a 'technical failure' as leverage for political pressure. Nonetheless, it is unlikely that Turkey would choose such measures since it wishes to establish its position as a an important transit country for oil and gas from Central Asia to Europe, a position that requires it to project reliability and stability towards all the parties. It is also unlikely given the fact that for over a decade most of Israel's oil imports have passed through Turkey (through the BTC pipeline which comes from the Caspian Sea and through tankers passing through the Bosphorus Strait), but Turkey has never threatened to disconnect the supply to Israel, even during particularly low points in the relations of the two countries.

Gas liquefaction

Gas liquefaction would enable Israel to export gas more freely to distant markets by tankers. Nonetheless, at this stage it is unclear whether it is economically feasible to construct a liquefaction installation for the gas quantities found in the reservoirs of Israel. In this context, it is possible that further discoveries of gas in the region could increase the feasibility of Israeli LNG exportation. According to the estimates, the 'Zohar' gas field in Egypt contains between 450 to 800 billion cm of natural gas. The joint output of the Egyptian field together with the Leviathan reservoir may make the gas liquefaction project worthwhile on a regional infrastructure basis. In this context, it is important to note that Egypt

already has a gas liquefaction installation, which has been underused in recent years. Nonetheless, it should be noted that the repeated attacks on the pipeline that had transported Egyptian gas to Israel in the past indicates that there are significant security challenges to cooperation with Egypt in the energy sphere, particularly with the rise of terrorist organizations in the Sinai Peninsula. Cyprus also has plans to construct a gas liquefaction installation for export purposes, but for this to materialize it is necessary to construct a pipeline and develop the 'Aphrodite' field. This option also bears a security risk resulting from the presence of infrastructure critical to Israel within the territory of a foreign country.

Security challenges

In general, the gas infrastructure – the fields themselves, the pipelines connecting them to the Israeli coast and the pipelines that will be used in the future for export – could serve as targets for an attack by various terrorist organizations. This threat has led the Israeli navy to acquire four new 'corvettes' in order to protect the infrastructure. Another important step to ensure the security of the gas supply will be construction of an additional pipeline from the Tamar reservoir to the coast, as well as construction of a pipeline from the Leviathan field to the Israeli coast, so as to enable redundancies in the event of an attack on one of the pipelines (for further details regarding the challenges of protecting the gas infrastructure, see chapter 7 in this report).

In addition to the possibility of physical damage to the gas infrastructure, the natural gas discoveries also create risks of heightened tension and regional hostility. A major source of such tension is the dispute between Israel and Lebanon pertaining to the maritime delineation of the economic zones between the two countries and consequently also of their gas fields. Hezbollah has declared in the past its readiness to protect the Lebanese gas fields against Israeli 'theft'. Identification of mechanisms for negotiating with the government of Lebanon is important from both security and political aspects and helps prevent uncertainty on the part of entrepreneurs and investors in the gas fields operating in both countries.. It should be noted that at the moment there is no knowledge regarding the presence of gas or oil reservoirs within the territory in dispute between the two countries, but so long as the dispute exists, exploration will not be possible.

A further issue that Israel must consider pertains to the 'Gaza Marine' offshore gas field located near Gaza, which according to estimates contains approximately 30 billion cm of natural gas. The development of this field could significantly help the economic situation in the Gaza Strip by allowing a steady supply of electricity

to the Strip. For this purpose, construction of a gas operated power station in the Strip will also be necessary. On the other hand, there is concern that the development of the field would strengthen the position of Hamas vis-à-vis the Palestinian Authority and would increase its coffers, which would lead to additional security challenges for Israel. Another question pertains to the identity of the actors who would be involved in the development – while the concessions on the field belong to BG, there is a possibility of involvement of various actors other than the Palestinian Authority, among them Jordan – which has an interest in importing natural gas and may encounter less political opposition if it imports it from Gaza instead of from Israel. Another actor that may enter the arena is Qatar, a country with extensive experience in the production of natural gas.

A final security issue pertains to the identity of the state entrepreneurs which may take part in Israel's gas ventures. In 2012, Russia's 'Gazprom' sought to purchase a significant stake in the Leviathan field, but was denied due to various considerations (among which was the refusal of the American-based 'Noble Energy' gas company to allow a Russian foothold in its reservoirs). This issue rises again in the context of possible new exploration efforts in the economic waters of Israel, as various state entities – such as Russia and China – express interest in the acquisition of exploration licenses. Israel must balance between its desire to attract new entrepreneurs on the one hand and the political and security consequences of admitting state entities into its energy market on the other hand. The admittance of Russia, or alternatively of a private company that works in close cooperation with Russia (such as the Italian 'Edison') could raise concern among potential customers in Europe, who wish to purchase Israeli gas in order to lessen their dependence on Russian gas companies, not increase it. This is in addition to the various political and security risks arising from the activity of these countries close to the shores of Israel, which would restrict the freedom of movement of the Israeli navy and would facilitate its monitoring by a foreign entity.

Chapter 10: Shipping and Ports

Aryeh Rona

The shipping infrastructure in Israel is composed of the ports, the shipping companies and the ships, both Israeli and foreign, that visit Israel's ports. The ports are an important link in the logistic chain that Israel is a part of, with about 98 percent of Israel's trade (by volume) being carried by sea.

In recent years, emphasis has been on the development of the ports. The development of the *Hamifratz* port in Haifa and the *Hadarom* port in Ashdod began already in 2015 and by 2021 these ports will have the capacity to handle container ships that are larger by tens of percent of the ships handle today, which will make transshipment possible on a large scale in Israel's ports.[1] In parallel to the development of the ports, there is a significant downward trend in the number of ships under Israeli ownership or controlled by Israeli companies, as well as a reduction in the number of Israeli seamen.

Regional maritime trade in recent years

About half of global trade, and primarily trade between Asia and Europe, passes through the Suez Canal. The location of Israel near the northern end of the Canal, along with the fact that Israel is characterized by the rule of law and political stability (especially relative to the upheavals in the region since 2011), create the potential for Israel's ports to become significant centers for transshipment in the Eastern Mediterranean. This can serve to link the Israeli economy—which is dependent on foreign trade—to the global trade chain, to reduce the price of sea transport for Israeli importers and exporters and to expand the industries that provide services to the shipping industry.

Currently, Israel is in the process of developing two ports—*Hadarom* and *Hamifratz*—in order to increase the capacity to absorb large container ships of up to 18,000 TEU.[2] Starting from 2021, the expansion of the two ports will solve the problems being experienced in the Haifa and Ashdod ports, which are not properly equipped to deal with transshipment and loading due to the growing dimensions of

1 The unloading of cargo from one ship to another in order for it to be transported to its destination.

2 A 20-foot container. This size serves as a measure of volume of containers and container ships. TEU=twenty foot equivalent unit.

ships currently sailing from Asia to Europe.[3] The inability to handle transshipment also exists in other Middle East ports.

Starting from 2011, the Middle East has suffered from a lack of political stability. This has led to terrorist activity that affects maritime trade and investment in the development of new port infrastructure, as well as creating an atmosphere that hampers the international cooperation needed for modern shipping. According to Yigal Maor, the Managing director of the Shipping Ports Authority, the threat of a boycott still hangs over Israel[4] and the efforts of the BDS movements against Israel (such as boycotting ZIM ships in the US) have also impeded cooperation in the region.[5] Nonetheless, it is worth mentioning that this has involved only isolated incidents so far.

The attacking of ships in the Suez Canal and tankers in the Straits of Hormuz has also harmed the stability of shipping in the Middle East.

These events increase the rate of shipping insurance. In this context, it is worth mentioning the events of the Second Israel -Lebanese War (2006), during which the prices of insurance soared to the point that the State had to provide alternative insurance (by means of the Inbal government insurance company) and a special arrangement was reached with Lloyds through an official Israeli delegation, with the goal of reducing the insurance costs of ships calling at Israeli ports.

Egypt, under the leadership of President el-Sisi, is completing the development of a huge infrastructure project in the Suez Canal area (called the SCZ project) with the goal of significantly expanding the canal and Egypt's revenues from it. This includes, among other things, the construction of an industrial zone along the canal.[6]

According to Egyptian sources, the Suez Canal project will create about one million additional jobs in Egypt. The project will also have economic advantages for Israel.[7]

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3 Froilanger Dov, Vice President for Development in the Israel Ports Company; interview on July 3, 2016. The "planning" ship for the ports being constructed is 18,000 TEU.

4 Maor Yigal, "Implications of the political events in the Middle East and the Red Sea on Israel", *Strategic Assessment*, Volume 18, Issue 2, July 2015, pp. 41–51.

5 Ibid., p. 43.

6 Ibid., pp. 46-47.

7 Maor Yigal, CEO of the Shipping and Ports Authority in the Ministry of Transport, in an interview on June 29, 2016.

Global trends in shipping that affect Israel

Up until the beginning of the 2000s, the shipping industry was subject to cyclical fluctuations. In 2007, there was a sharp increase in the demand for new ships. The orders of new shipping capacity reached 67 percent of the existing global shipping capacity, while global trade grew by only about 5 percent annually. In 2008, with the onset of the global financial crisis, a downtrend appeared in global trade.

In the same year, the shipping conferences in Europe were canceled, which led to a drop in shipping costs.[8] The low shipping prices have continued until today, as has the low level of new container ship construction. This is in spite of the fact that in previous downturns the shipping companies have taken advantage of the lower costs of construction to equip themselves with new ships.[9]

The implication of these trends is that maritime shipping prices have remained low during the past decade despite the aforementioned cyclical influences.

In order to minimize economic losses, the shipping companies have taken a number of steps: limiting the speed of voyages in order to save fuel (in addition to introducing improvements in ships' engines in order to save fuel and prevent polluting emissions) and the addition of smaller vessels in order to maintain weekly services (i.e. a schedule in which a ship visits a port once a week, on a fixed day, in order to create reliability in container service).[10]

Tonnage tax as an incentive for shipping

There is strategic importance to having a merchant fleet flying under the Israeli flag. The Israeli economy is dependent on foreign trade (imports and exports). Due to Israel's geopolitical position and its lack of access to land trade routes, 98 percent of Israel's trade is carried by sea.

In the global shipping industry, the norm has developed of registering ships under flags of convenience, which is manifested in the "flight" of merchant fleets to countries with the most convenient tax and regulatory environments. As a

8 Shipping conference – an arrangement between a number of shipping companies in order to set shipping prices. It was cancelled by the EU and also by Israel. A number of Israeli shipping companies were members of the European conferences. In Israel, the conferences were cancelled in 2012.

9 A ship with a capacity of 12,000 TEU could be built for a cost of about $172 million, while a year into the downturn the price had dropped to only $105 million.

10 Zeva Yoram, President of the Israeli Chamber of Shipping, interview on July 4, 2016.

solution to the flags of convenience problem and the manning of ships by foreign crews, Europe has developed an incentive in the form of a tonnage tax which is imposed on the capacity of vessels owned by each company (a lower rate of tax that encourages an increase in tonnage), instead of a corporate income tax at a higher rate (about 26 percent in Israel). This tax regime, which is to the benefit of shipping companies, is accompanied by a commitment on the part of ship owners to maintain partially national crews (in our case, Israeli crews) and to participate in the cost of training lower-level officers.[11]

Many countries have adopted a tonnage tax in order to preserve their national fleet. In Israel, the proposed legislation is in the process of being passed. In 2016, a memorandum of the law was published for comments by the public and the law will likely go into effect at the beginning of the 2017 fiscal year.

The Israeli merchant fleet

The shipping industry is one of the most globalized industries in the world since it necessarily requires a connection between a shipping company's country of registration, the ships' country of registration (the ship's flag) and the country receiving the service. This is one of the reasons, as mentioned, for the flight of ships to registration under flags of convenience in order to reduce taxes and regulation. Therefore, when analyzing the Israeli merchant fleet, one needs to distinguish between a vessel under the Israeli flag (according to the Law of Shipping (shipping vessels), 5720 – 1960) and a ship under a foreign flag but under Israeli control (according to the Law of Shipping (all foreign vessels under the control of an Israeli entity), 5765 – 2005).

At the beginning of 2016, there were 36 ships under Israeli ownership or control, with a deadweight tonnage (DWT) of 2,127,012 tons, of which 10 ships, or 18 percent of the fleet, flew an Israeli flag.[12]

ZIM Shipping Services: Includes 8 ships with DWT of 434,000 tons which are owned or controlled by ZIM, all of which are container ships. Of these, three fly the flag of Israel. The company also operates ships under lease for various short-term periods.

11 As of February 22, 2016, the Israeli merchant fleet numbered 36 ships with deadweight tonnage of 2,127,012 tons. In 2011, the fleet numbered 56 ships with deadweight tonnage of 3,265,581 tons. According to the report of the Shipping and Ports Authority dated January, 2011 and also the Statistical Yearbook of Israeli Ports 2015, p. 95. On government assistance to shipping, see the section on maritime manpower.

12 Statistical Yearbook, Shipping and Ports 2015, the Shipping and Ports Authority, pp. 95-96.

XT Maritime Ltd.: The company has 13 ships with DWT of 1.235 million tons, of which 9 are container ships, three are coal bulk carriers, and one is a tanker. Two ships fly the flag of Israel.

Other companies: Six general cargo ships, two bulk carriers and one coal carrier. Overall tonnage of 457,000 tons. Five ships fly the flag of Israel.

The share of ZIM, which was in the past the dominant carrier of the Israeli merchant fleet, has fallen from 36.4 percent to 20.4 percent, while other companies have increased the number of ships they maintain. It should be mentioned that relative to 2011 the Israeli merchant fleet has shrunk significantly.

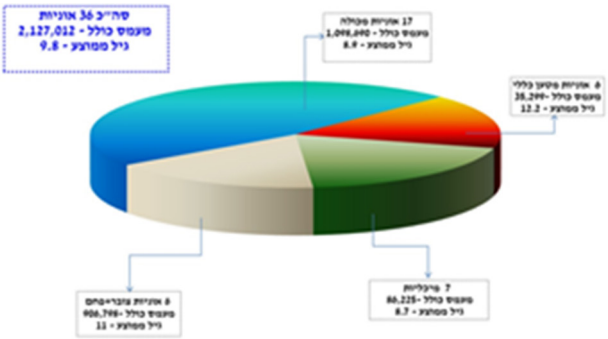

Figure 10.1 Ships in the Israeli merchant fleet by type, DWT and age – February 22, 2016[13]

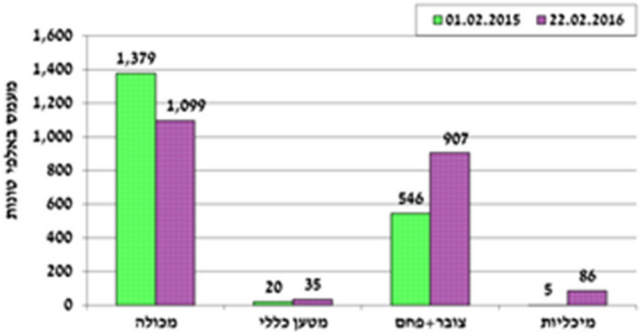

Figure 10.2 Total tonnage of the Israeli merchant fleet – comparison to previous year

13 Statistical Yearbook, Shipping and Ports 2015, p. 95.

Manning the merchant fleet

The reasons that led Israeli shipping companies to switch to flags of convenience include the reduction of ships' operating costs and the high salary costs of Israeli officers and seamen relative to those recruited from the Third World.

The government of Israel has subsidized the shipping industry in order to maintain the existence of an Israeli merchant fleet, including ships and seamen. This was accomplished in a number of government decisions[14] that imposed an obligatory minimal Israeli crew (officers only) and provided subsidization and financial support and tax exemptions; however, these measures were not sufficient to prevent the decline in the number of ships flying the Israeli flag or that are under Israeli control.

As of 2016, the Israeli merchant fleet had 630 seamen, of which 207 were Israelis. There included 255 active officers, of which 166 were Israeli; all of the cadets are Israeli. There are 355 ratings, only one of which is Israeli.[15]

The coastal shipping industry (gas drilling services) is growing and there is a trend taking shape of the entry of Israelis into the industry. In the future, the Ministry of Transport will need to establish regulations and criteria for the employment of foreigners in this industry.

There are a small number of cadets in the merchant fleet (about 40) and the small number of ships under the Israeli flag hinders the recruitment of new cadets and the opening of courses at the School for Training of Maritime Officers in the city of Acco. As the number of ships that are required—according to the shipping regulations— to have Israeli officers declines, it will become more difficult to recruit and train cadets, who constitute Israel's future maritime reserve of manpower.

The shortage of maritime manpower also has implications for the operation of the ports in Israel and for the supervision by the Israeli government (i.e. regulation) of the shipping industry. In order to operate the ports, there is a need for

14 Government Decision 1178 from 1996 reduced the minimal number of Israeli crew members to 10 officers and ratings (out of 20 crew members). Government assistance totaled NIS 35 million over two years. In 1999, Government Decision 4797 provided the shipping companies with NIS 20 million for a period of 4 years. In parallel, the obligation to man a ship with Israelis was restricted to only officers and Israeli ratings were gradually removed from the equation. Government Decision 1107 from 2013 promised additional assistance until 2016, changed the tax regulations and raised the rate of depreciation on ships up to 20 percent.

15 Statistical Yearbook, Shipping and Ports 2015, pp. 97-99.

experienced maritime officers to fill jobs such as pilots and controllers and they must be recruited from within the maritime manpower employed in shipping.

Activity in Israel's ports

There are five ports in Israel, three of which are commercial (Haifa, Ashdod and Eilat) and two of which are energy ports (Hadera and Ashkelon–Trans-Israel Pipeline). In 2015, 5,893 ships visited the ports of Israel (apart from coal and fuel carriers). This is somewhat less than during the period 2011–14. Most of the ships were container ships.

Most of the cargo arriving and leaving Israel is carried by sea. This amounted to about 70 million tons during the past year, of which 27 million was fuel and coal (most of which passed through the two energy ports of Hadera and Ashkelon).

In February 2005, the government carried out a reform of the ports. The Ports Authority was dismantled and instead three companies were established in its place: the Port of Eilat, the Port of Haifa and the Port of Ashdod, as well as one asset-holding company (the Israel Ports Company). The government remained the regulator of the ports by means of the Ministry of Transportation (the Shipping and Ports Authority). Meanwhile, the port of Eilat was privatized, and so was Israel Shipyards, which are active as private companies in Israel's ports.

In 2010, a reform of port fees went into effect, with the goal of simplifying the fee system and thus encouraging competition between the port companies and the signing of commercial agreements with the shipping companies in order to create a continuum of operations.

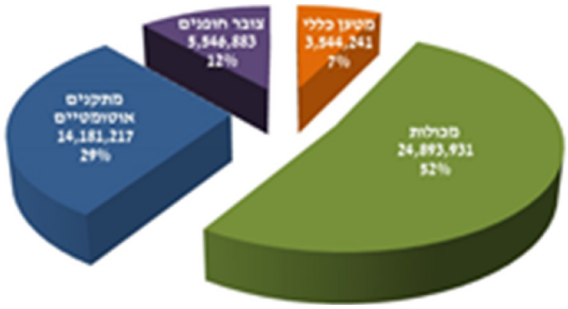

Figure 10.3 Breakdown of cargo moved through Israel's ports – 2015[16]

16 Ibid., p. 14.

Development of the ports

The development of the *Hamifratz* port in Haifa and the *Hadarom* port in Ashdod will make it possible to accommodate ships with a capacity of 18,000 TEU. The ports are being built on the landlord model, according to which the State is the owner of the port (the land) and builds the port, while a concessionaire that is chosen by tender operates it.

The two ports will be operated by two international operating companies who are signed on 25-year contracts. Each of the ports will be able to handle about one million TEU's annually.

It is planned that the *Hamifratz* port will accept its first ship in 2021. In the first stage, it will have 800 meters of piers for container ships. The cost of building the port is about NIS 35 billion. The operator of the port is the Shanghai International Port Group. As mentioned, the port will be able to handle ships with a draft of 17.3 meters.

The *Hadarom* port, which will also accept its first ship in 2021, will be operated by TIL, a subsidiary of MSC, which operates 30 ports worldwide.

These ports will have the capability of transshipment, which is a guarantee that large ships will visit and that trade services will be provided. Transshipment can also help to create subsidiary industries. Without transshipment, a situation may arise in which only small and medium-size ships will visit Israel's ports. Such a phenomenon will lengthen shipping times and will increase costs to the economy due to the dependency on transshipment ports close to Israel.

Conclusion and recommendations

In view of its political situation, Israel must take responsibility for maintaining a minimal merchant fleet, which means maintaining the ships and maritime manpower that currently exist.

The golden share, which was part on the privatization of the ZIM company, was intended to some extent to maintain this situation. However, in our view, it does not provide a sufficient solution to the decline that is occurring in the size of the Israeli merchant fleet and its manpower.

In this situation, Israel is liable to become dependent on foreign shipping even for its most essential needs.

It should be remembered that foreign shipping companies as a rule raise their prices during times of emergency and this is felt in the insurance premiums in our region, which has been declared a war zone.

The operation of the existing and future ports (which will be inaugurated in 2021) require trained maritime manpower, including pilots and other professionals. They naturally are recruited from among the officers of the merchant fleet. The declining number of ships and the difficulty in training cadets is liable to create a shortage of trained maritime manpower in the ports in the future.

The development of coastal shipping connected to gas exploration and drilling constitutes an opportunity to train Israeli manpower for this developing industry.[17] Nonetheless, it should be remembered that this is a limited alternative that cannot serve as a substitute for the training of maritime manpower for the merchant fleet.

The institution of the tonnage tax regime is likely to encourage shipping companies to increase their activity and the fleet they operate. This measure has not yet been implemented in Israel, but even if it is there is no guarantee that it will lead to an increase in the merchant fleet. Nonetheless, it should be mentioned that the tonnage tax instituted in other maritime countries has indeed led to an increase in the merchant fleet and has significantly encouraged the development of maritime manpower.

The reform in port fees also led to increased competition between the ports. This policy will allow the ports to sign independent agreements with the shipping companies and create a situation in which a ship visits on a fixed day in the week.

The development of the ports and the exploitation of existing infrastructure is already encouraging competition over transshipment cargo, which currently accounts for 12 percent of container cargo (most of it in the Haifa port).

17 The issue of splitting ZIM into two companies, one Israeli and one foreign, was discussed already in 2003. According to the opinion of the Ministry of Justice, it should be ensured that the company will remain a "going concern", in order that the core fleet, i.e. the number of essential ships, will be effective. This was also reflected in the "Ministers' Letter" which was published a day after the opinion, on October 27, 2003, and which stated that in the event that the company is split, the core fleet should be increased to 18 ships. The letter made clear statements as to maritime training and ZIM was required, in the event of a split, to maintain ZIM Israel as a going concern. In addition, the Ports Authority released a position paper on September 16, 2003 which stated that "…the goal is to maintain an infrastructure of Israeli maritime manpower, ships and seaman, as a strategic asset and without Israeli owned or controlled ships, it is doubtful that this can be done."

The infrastructure under construction will require the *Hadarom* port and the *Hamifratz* port to compete for transshipment cargo with the ports in the Eastern Mediterranean.

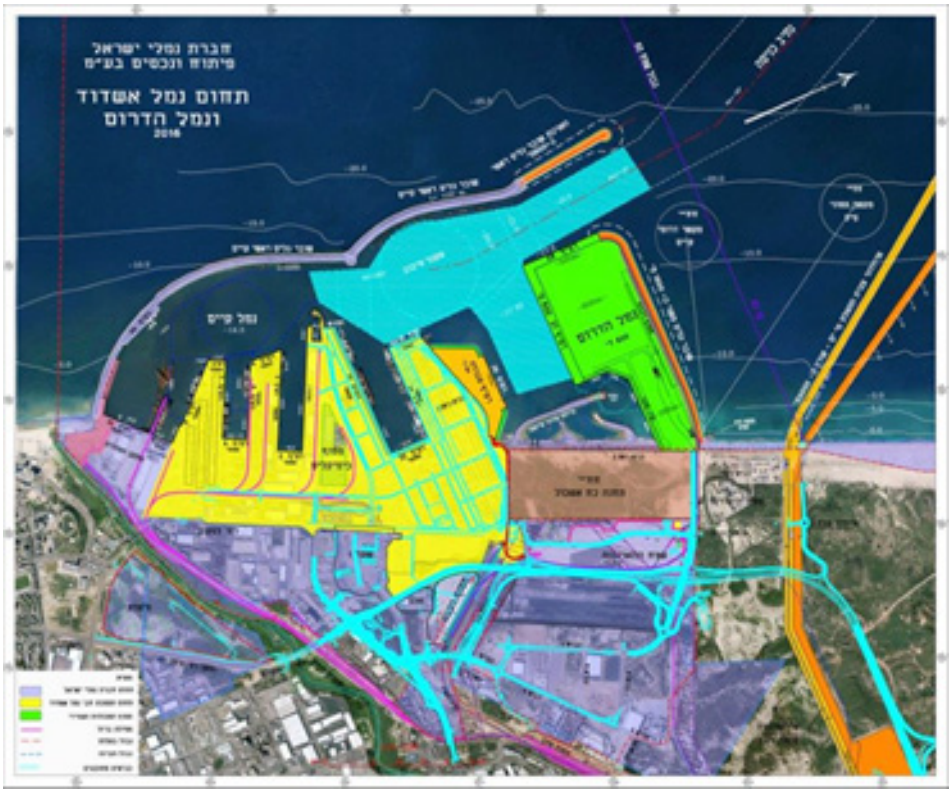

Figure 10.4 Map of the port of Haifa

Figure 10.5 Appendix B: map of the port of Ashdod

Chapter 11: The Status of Offshore Gas Field Developments, the "Framework" and Other Alternatives

Orin Shefler

Summary

The year 2016 was characterized by further development of the natural gas sector with the approval of the "Framework for Increasing the Quantity of Natural Gas Produced from the Tamar Natural Gas Field and the Fast-Track Development of Leviathan, Karish, Tanin and other Gas Fields" (herein: **the Framework**). The Framework was the result of negotiations and agreements between the State of Israel and the oil and gas companies, based on the mutual recognition that in order to preserve the status of Israel as an attractive destination for investment requires balancing between various interests. In 2016, some uncertainty remained until the Framework was finally scrutinized by the judicial system (with changes to the section on regulatory stability). Thus, a connection between foreign relations and security on the one hand and the natural gas sector on the other was established and ratified. Moreover, in 2016 mutual steps were taken by the State and the oil and gas companies in preparation for the final investment decision on developing the Leviathan reservoir (herein: **Leviathan**) and other fields. In 2016, the State also took steps to increase local demand for natural gas by encouraging the conversion of industry to natural gas, the use of natural gas in private and public transportation and expansion of the onshore transmission and distribution infrastructure according to a structured work plan. A goal of the aforementioned actions was amongst other things, to encourage the development of the gas fields in a timely manner. In addition, technological alternatives and plans for developing the gas fields were examined.

Background and Current Status

The State of Israel currently consumes natural gas from a single source (over 50 percent of its energy consumption comes from the Tamar reservoir) with supplementary imports of Liquefied Natural Gas (herein: **LNG**) via a subsea buoy connected to a Floating, Storage & Regasification Unit (herein: **FSRU**) for LNG import. Israel is effected by a lack of competition in the natural gas sector (which influences price) and suffers from a lack of regulatory coordination. Therefore, the

key effort of the Ministry of National Infrastructures, Energy and Water (herein: **the Ministry of Energy**) in 2016 was to resolve these issues.

When and How Will Leviathan Be Developed?

Leviathan was discovered in 2010 and is the largest reservoir for which a lease has been granted to date in Israel. Its development has been delayed repeatedly for various reasons. In order to accelerate its development, the Framework was approved in *Government Decision 476* (August 16, 2015) and was passed by the Knesset (September 7, 2015). The Prime Minister, in his additional function as Minister of Economy and Industry invoked section 52 of the Antitrust Law – 1988 granting the oil and gas companies an exemption from certain antitrust issues following discussions in the Economic Affairs Committee in the Knesset and a public hearing widely covered by the media (December 17, 2015).

Following legal proceedings, the High Court of Justice rejected section 10 of the Framework which offered far reaching regulatory stability commitments (March 27, 2016). Mutual efforts by the government and the gas companies produced agreement on different wording and formulation which was re-approved by the government (May 22, 2016).

The Framework focuses on: Resolving the matter of over-reaching holdings of proven reservoirs within a predetermined time period (Tamar, Leviathan, Karish and Tanin), the fast track development of Leviathan and other reservoirs; consumer protection and the option of reducing purchase agreements from the Tamar reservoir in favor of new reservoirs. One of the major achievements for the State in the Framework was the agreement regarding local content purchases in the amount of NIS 500 million over eight years.

Prior to the Framework was the adoption of the *Recommendations of the Committee to Examine Government Policy Regarding the Natural Gas Sector in Israel* (herein: **the Tsemach Committee**) in *Government Decision 442* (September 13, 2012). This decision sets the gas export quotas while ensuring domestic gas supply to the local market for as long as the quantity available to the domestic economy is no less than 540 BCM.

Thus, it was decided that a reservoir that contains 200 BCM or more will supply 50 percent of its gas to the local economy; a reservoir that contains between 100–200 BCM will supply 40 percent; a reservoir that contains 25–100 BCM will supply

25 percent and a reservoir that contains 25 BCM or less will supply a minimal quantity to be determined.

With regard to export permits, the leases for Leviathan North (I/14) and Leviathan South (I/15) (granted on March 27, 2014) impose obligations that must be met prior to the grant of an export permit (such as an obligation to connect each reservoir to Israel).

From a statutory perspective, the *National Outline Plan for Gas Treatment Facilities from the Offshore Discoveries* (herein: **Tama 37h**) was approved by the National Council for Planning and Building (October 22, 2014). The National Council for Planning and Building thereafter approved the offshore segments, including the intended location for offshore treatment facilities (April 5, 2016).

From a commercial perspective, the primary markets for natural gas produced from Leviathan are the local market (Israel) and international markets (the Palestinian Authority, Jordan, Egypt, Turkey, Greece, Cyprus, Europe and Asia).

In the local market, agreements that have already been signed and publicly announced are between the Leviathan partnership and Edeltech for the sale of 6 BCM over a period of 18 years to its power plants; the IPM company for the sale of 13 BCM over a period of 18 years for power plants under construction; and the Paz company for the supply of gas to the refineries in Ashdod over a period of 15 years.

There are a number of agreements in the making that perhaps will be signed in the future.

As of January 2017, the **Base Price**, as defined in Chapter D of the Framework and published by the Gas Authority, was $5.17 per MMBtu and the simple average for private electricity producers was $4.70 per MMBtu.[1] The Framework specified a mechanism for choosing between alterative methods of calculating the price during the negotiation of the sale contract without absolute price control by the State, but while maintaining a rigid and transparent system.

One of the challenges currently facing the local industry is the conversion to natural gas and connecting consumers to local distribution networks. The challenge is due to low investment assessment related to conversion costs and the price of natural gas relative to other low cost alternatives for energy production.

1 The unit of measurement for natural gas is MMBtu: Million British Thermal Units, which is also used in gas sale contracts.

In order to encourage industry to shift to natural gas consumption, government ministries increased the grants to consumers in 2016 which may improve the investment assessment for consuming natural gas (April 20, 2016).

In addition, it was recently decided to phase out some of the coal-burning power plants ("Orot Rabin") over time. Furthermore, a plan was formulated to increase the use of natural gas in transportation. These steps were intended to increase local demand for natural gas and to encourage the development of the fields, among other things.

In the international market, the first export deal for gas from Leviathan was signed between the Leviathan partnership and NEPCO, the Jordanian electricity company, for the sale of 45 BCM of gas over a period of 15 years, with an estimated value of $10 billion (September 26, 2016). The supply of gas to NEPCO will be through the northern entry point on the Dor coast according to Tama 37h and to the point of delivery. There is political opposition in Jordan to purchasing gas from Israel and to the gas price (according to unofficial reports, the assumed price for the deal is $6.2 per MMBtu). (The price was not officially announced and it is unclear if this price includes the price of overland transmission to the border and other costs.)

The Leviathan and Tamar partnerships have reported additional non-binding understandings (term sheets) for the sale of natural gas to customers in neighboring countries from the Leviathan and Tamar reservoirs.

The delay in the development of Leviathan in 2016 occurred in parallel to international events that reduced the investment assessment for development and increased its risks. Thus for example "the discovery of a large offshore gas field in Egyptian territory and falling global energy prices. The lower prices have made alternatives to Israel's offshore gas more attractive. The gas producers' financial strength has diminished... Access to project financing for energy projects has been substantially reduced and has become more costly as a result of the significant deterioration of the energy lending markets" [2]

In summary, preparations have been made to advance the development of Leviathan. The focus now is on raising the necessary capital. It is believed that there is a need for gas sale agreements in the amount of at least 4–6 BCM per year from the reservoir in order to raise the capital needed for development. Noble Energy reported that a final investment decision (**FID**) will be made "as early as

2 Report of the Commission on the Eastern Mediterranean sponsored by University of Haifa and the Hudson Institute, September 2016, p. 34.

the end of 2016".[3] **Note**: Since this article was published, the Leviathan partnership announced that they have made the highly anticipated final investment decision (FID) on February 23, 2017.

What is the Current Development Plan for Leviathan?

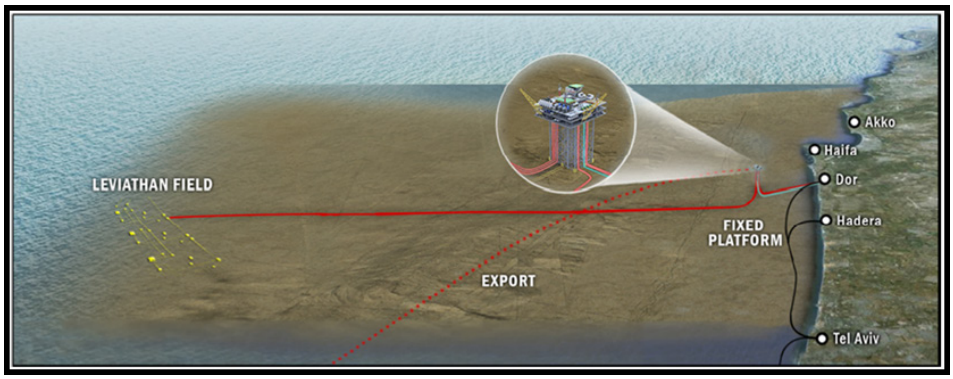

Figure 11.1 Development plan for the Leviathan reservoir[4]

The Leviathan partnership submitted a new development plan on February 25, 2016. It is based on Tama 37h and includes a process platform in shallow water (approximately 80m-100m). The change implicit in the new development plan is that the Leviathan partnership has for now sidelined the vision of using a floating facility above the field within Israel's EEZ for Leviathan using a Floating Production Storage Offloading (**FPSO**) unit. This is a more difficult plan to implement for various reasons, including security, environmental protection and engineering, technological, operational and logistical challenges. These difficulties provide a clear advantage to the new development plan for a process facility in shallow territorial waters in accordance with Tama 37h.

The Commissioner for Petroleum Affairs in the Ministry of Energy (herein: **the Commissioner**) approved the new plan in principle (June 2, 2016) and wrote as follows: "The approval of the development plan relates to the underwater system in the reservoir, the pipeline to the handling platform, the platform for handling and production, the export pipeline from the handling and production platform,

3 Noble Energy executes Leviathan gas sales contract with the National Electric Power Company of Jordan. http://investors.nobleenergyinc.com/releasedetail.cfm?ReleaseID=990815

4 The Ministry of Energy and the Leviathan partnership.

the pipeline from the platform to the Israeli coast and the onshore facilities, all according to Tama 37h"[5]

The Ministry of Energy has revised the estimated quantity of natural gas that will be produced from Leviathan to 17.6 TCF (about 500 BCM). There were recent reports on a disagreement between the Ministry of Energy and the Leviathan partnership regarding estimates of the quantity of gas in the Leviathan reservoir. The issue will not be decided until there are future drillings that will enable a more exact assessment. Additional drilling is expected during 2017 as part of the development of the reservoir.

The new development plan includes the possibility of exporting gas from the Leviathan platform by means of an onshore pipeline, by way of the northern entrance to the Dor coast, which will be built according to Tama 37h, and the national transmission system (**NTS**).

Once delivered to the NTS, the gas will reach its onshore export destinations in Jordan, Egypt and the Palestinian Authority and/or alternatively, by way of an underwater pipeline to countries and/or liquefaction facilities abroad. It should be noted that oil may exist in the geological formations of Leviathan as well.

The components of the handling, process and transmission system of Leviathan up to the point of entry to the NTS will be built and owned by the Leviathan partnership and used for the benefit of Leviathan at first. As such, the Leviathan partnership will have the exclusive right to use their facilities as they see fit, although the Commissioner has the option, according to Chapter 9 of the Leviathan lease[6] "to instruct the leaseholder to provide handling, pressure reduction and transmission services for remuneration to another leaseholder, without discrimination and subject to considerations of safety and the necessary approvals according to law … this is under the assumption that there is excess capacity to provide service that is not reasonably required by the lease owner" (The implementation of a mechanism of this type for cooperation between suppliers in the use of gas handling facilities is very complex and must be examined thoroughly from various angles).

The approval of the development plan is conditional on a detailed engineering plan, the submission of the required engineering and environmental documents

5 http://energy.gov.il/AboutTheOffice/SpeakerMessages/Pages/GxmsMniSpokesmanOSJune16.aspx

6 Lease deed for Leviathan South and North I/14 and I/15.

and the specific approvals of the relevant authorities.[7] The Leviathan partnership submitted a request to receive building permits during the third quarter of 2016, most of which were approved.

To a great extent, development of Leviathan is dependent on export deals, which are influenced by the geopolitical situation. Export deals are likely to affect the timeliness of the reservoir's development and the choice of the preferred technology, which will determine the costs of development.

It will take up to 48 months from the grant of exemption under section 52 of the Antitrust Law as agreed in the Framework (starting from December 17, 2015) for first gas to start flow to the local market from Leviathan and subject to the necessary investments, the signing of sales contracts, the granting of approvals, the preparation of the work plan and resolving potential technical problems. This date may again be delayed due to legal proceedings that were held immediately after the grant of the exemption. **Note**: Since this article was first published, the Leviathan partnership has made their FID decision and anticipate first gas from the Leviathan field by December 2019.

Will the government be involved in constructing offshore transmission infrastructure in order to encourage the development of small and medium-size reservoirs and what are the existing technological alternatives?

Several technological options for government involvement in the construction of the offshore transmission system were examined in 2016, with the goal of preserving essential long-term interests and assisting the gas producers in the development of small and medium-size fields.

According to one of the proposals, the national infrastructure may include a platform (HUB) and offshore pipeline that will be an integral part of the NTS, which will be expanded to sea for about 8–10 kilometers. This infrastructure will be used for gathering processed gas from suppliers and will transmit the gas to shore but will not process it (Gas process is the responsibility of the suppliers according to their Lease). This approach is supported by the Technion's Maritime Plan for Israel.

7 The Ministry of National Infrastructures, Energy and Water, the approval of the development plan for the leaseholdings Leviathan South I/14 and Leviathan North I/15 for the Leviathan partnerships. http://energy.gov.il/AboutTheOffice/SpeakerMessages/Pages/GxmsMniSpokesmanOSJune16.aspx

One of the weaker points of the current supply of gas in Israel is the fact that there is only one source (the Tamar reservoir) and one intake facility into the transmission system. In order to provide a solution to this problem, Israel Natural Gas Lines Ltd (herein: **Natgaz**), a government company, constructed a subsea pipeline and buoy that connects to an FSRU for the reception of LNG import shipments.

Figure 11.2 FSRU

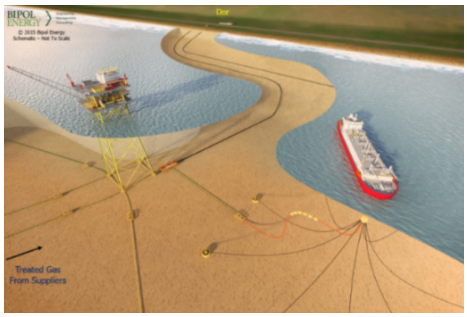

Figure 11.3 National infrastructure for the channeling and monitoring of processed gas (HUB) that includes an FSRU

While the development of Leviathan was delayed and some uncertainty in the implementation of the Framework exists, a proposal was examined to duplicate the FSRU system by means of adding another FSRU system and subsea buoy, with the goal of increasing the import of LNG when needed and/or to provide a solution for interruptions of the supply of gas from the Tamar reservoir. Also examined was a proposal to integrate a FSRU system of this type as part of the planned northern entry at the Dor coast, according to Tama 37h.

In 2013, the Israel Electric Company (herein: **IEC**) began purchasing LNG from the international energy markets. Recently IEC have increased their purchase agreements. In 2016, it was reported that IEC purchased LNG at a lower price than that of the gas supplied from the Tamar reservoir. It should be mentioned that these were one-time deals that cannot be relied on in the future.

In September 2016, the FSRU was refilled at sea for the first time in Israel. An LNG tanker connected to the side of the FSRU and conducted ship-to-ship transfer of LNG. This method enables the FSRU to permanently anchor in Israel's waters on a continuous basis and provide redundancy to the transmission system. The implementation was precisely planned and approved by the entities authorized by Natgaz and IEC. This involved the management of safety, environmental and

security risks that accompany a project of this type in the open sea, in view of the weather and ocean conditions.

National Plan to Encourage Development of Small and Medium-Sized Reservoirs (not yet published)

The government ministries are currently preparing a new national plan to encourage the development of small and medium-sized reservoirs. The plan was not included in the Framework and only parts of it have been presented to the public as part of the current roadshow.

According to reports and models that have been published, it can be assumed that the plan will include a group of specific incentives, which have not yet been defined, for the development of small and medium-sized reservoirs. The incentives will be in the fiscal domain (perhaps discounts and exemptions in royalties) and in the domain of offshore and commercial infrastructure. They may also include the expansion of the national transmission system to sea by the State and/or its institutions or applying a single buyer model (though with a low likelihood).

Government Decisions 442 and 476 encourage government involvement in the planning and construction of the gas infrastructures.

Is the Framework Being Implemented and is there Momentum in the Development of Israeli Gas Fields?

Transfer of rights in Karish and Tanin

The Framework requires the transfer of the rights to the Karish and Tanin reservoirs to a third party. The final transfer of the rights was approved by the Ministry of Energy on December 13, 2016 following an evaluation by the authorized entities, including the Commissioner of Petroleum Affairs in the Ministry of Energy and also the Director of the Antitrust Authority.

Immediately upon the approval of the Framework, leases on the Karish and Tanin reservoirs were granted to Noble Energy, Delek and Avner (it is thought that Delek and Avner will merge in the near future) so they can transfer them, in accordance with the Framework, to a third party.

As of today, the rights to the Karish and Tanin reservoirs have been transferred to Energean Oil & Gas (August 17, 2016). According to reports, the sale includes payment of about $40 million and royalties in the amount of 9 percent, subject

to the Framework. Energean is an international operator of small to medium size, which is based in Greece. Its main activity is along the western shores of Greece, where it is the only operator of a number of drilling rigs and platforms. Energean's fields are connected to a complex of platforms in shallow water, from which output, primarily oil, is transmitted to Greece. Energean is not in the category of the supermajors, such as Chevron, Exxon, etc.

The question now is when these reservoirs will be developed and in what manner and who will purchase the gas (which is intended only for the Israeli market according to the Framework)?

According to the Framework, once the transfer of the rights in Karish and Tanin has been approved by the Commissioner, the Leviathan partnership will be able to use the export quota of Karish and Tanin for its relative share of the Leviathan reservoir, subject to the approval of a swap transaction. This is a transaction between two leaseholders, in which one exchanges his export quota for the other's supply obligation to the local economy. The Framework permits swap transactions of this type between the Leviathan partnership and the Karish and Tanin partnership and restricts the sale of gas from Karish and Tanin to the local economy only. **Note**: Since this article was first published, the transfer of rights to Energean has been completed and Energean have published their initial field development concept which includes an FPSO positioned over the field and a pipeline to shore.

Dilution of Holdings in Tamar

Harel Insurance and the Israel Infrastructure Fund announced the purchase of 3–4 percent of Noble Energy's rights in the Tamar partnership (July 4, 2016), as part of the Framework's implementation, which requires the dilution of Noble Energy's holding in Tamar and the sale of all the holdings of Delek and Avner in Tamar. The possibility has also been reported of a public issuing of Delek and Avner rights (which are expected to merge in the near future) as part of the sale process.

Renewal of Exploration in Israel's Economic Waters

The Framework is intended, among other things, to restart the exploration in Israel's economic waters.

- **Lease of Tamar and Leviathan**. In 2016, the Tamar partnership announced that it intends to further expand the number of wells in the Tamar reservoir by the end of the year. In addition, additional drilling is expected in Leviathan as part of the reservoir's development. According to reports, there are negotiations with an operator of offshore drilling for this purpose. **Note**: Since this article

was published, new wells have been drilled in Tamar and are activities are soon to commence on Leviathan.

- **Roey license**. The Roey license is located in the western part of Israel's territorial waters, on the maritime border with Egypt. The exploration license was granted to Ratio, Israeli Opportunity and to Edison, which is an operator. As of now, the Roey partnership has announced its intention to carry out exploratory drilling by December 2016, in accordance with the work plan approved by the Commissioner. According to reports, there are negotiations with offshore operators. **Note**: Since this article was published, these activities have been postponed.
- **Ishai license**. The Ishai license is located in the western part of Israel's territorial waters, opposite Cyprus. Israel and Cyprus have signed an agreement delineating the maritime border between them and there is professional collaboration between the two countries, including the sharing of seismic information. According to reports, the Ishai discovery is located on both sides of the maritime border. On the Cypriot side, the Aphrodite field has been discovered in Block 12 by Noble Energy, Delek and Avner (today, Shell holds a percentage after acquiring the BG Company). On the Israeli side, the Ishai license was granted to Nammax, Israel Opportunity, Frendum and AGR. The plan for the development of the deepwater reservoir is technologically complex due the distance from the shore and because its development requires coordination and large-scale regional cooperation.
- **Daniel East and Daniel West licenses**. These licenses are located on the maritime boundary between Israel and Egypt. The licenses were granted to Isramco, Modiin and others. According to the new work plan, the partnership must carry out exploratory drilling by August and October 2017, respectively.

Mediation proceedings between the State and a number of gas companies began in 2016 regarding licenses that were returned to the State for various reasons.

Decision of the Petroleum Council to "Open the Sea" to Exploration

On August 10th, 2016, the Petroleum Council decided to begin granting new licenses for offshore oil and gas exploration. On November 18th, 2016, the documents were published describing the application process, including the minimal requirements for applicants and timetables for participation. The process will be competitive and applications will be discussed by the Petroleum Council according to criteria that have yet to be published. The standards will have to do with the capital and experience of the candidates in the development of deepwater reservoirs.

In September 2016, the Minister of Energy and his staff went on a roadshow in several countries (UK, Singapore and the US) in an attempt to interest companies and international investors. To this end, a strategic environmental survey for the exploration and production of offshore oil and natural gas was published for public comments (July 3, 2016) and a draft of the regulations for offshore exploration activities was approved by the Petroleum Council (September 8, 2016).

Figure 11.4 Map of the exploration licenses Source: Ministry of Energy

Note: Since this article was published, the information package has been published and updated and is available in at www.energy-sea.gov.il. Also, the dates for submitting proposals have been modified.

Conclusion and Assessment

- A framework for dialog and regional collaboration on resource development should be created.
- The potential for exporting gas to the region and even beyond (to Asia for example) should be investigated and assistance should be provided to the companies in order to reach these markets, by means of, among other things, the construction of national infrastructures for this purpose.

- Foreign investors and international operators should be encouraged to enter the Israeli market. To this end, attractive conditions for investment in the Israeli energy sectors should be created.
- Models and technology should be developed for regional cooperation. An assessment should be made of the geopolitical and technological implications of developing the fields and the export facilities (such as an underwater pipeline, floating liquefaction facilities, joint processing facilities and ports). To this end, shipping lanes and the approach corridors to Israel's ports should be kept open and safe.
- The use of natural gas reduces the costs of production in Israel for energy-intensive industries. Therefore, wise use of natural gas as a source of energy for the local economy should be encouraged and appropriate onshore transmission and distribution infrastructure should be created. In addition, natural gas is creating a new industry in Israel and conditions should be encouraged for integrating local industry and Israeli manpower within the energy sector, including the provision of ongoing logistic services to the platforms and drilling rigs from Israel's ports.
- Best practices in democratic regimes should be studied and laws, regulations and models should be adopted that will improve the development of natural resources. This should include the implementation of legal, strategic and holistic (multidisciplinary) thinking in the domain of resource development. Skills and abilities should be developed in the areas of maritime justice and supportive legal framework should be created. In addition, a national and civilian contingency plan is needed to prepare for malfunctions and leaks in the gas facilities and offshore fields.

Chapter 12: Artificial Islands for Energy Infrastructure

Motti Klamer

Israel is one of the 20 most densely populated countries in the world.[1] The shortage of land is reflected in the prices of real estate and the difficulty encountered by planners in balancing between various land uses, such as residential, industrial and commercial, public space, military, public infrastructure, etc. Additional environmental challenges that result from the shortage of land are the dangerous proximity of residential areas to infrastructure facilities, the lack of open spaces for recreation and the need to preserve nature and heritage sites.

Finding this kind of balance is even more complex in the case of the sea coast. The length of Israel's Mediterranean coast is about 196 km of which only about 53 are natural open beach. Forty percent of the country's population lives within a 10-kilometer strip along the coast. Along the coast of Israel, there is competition between seaports and marinas, electricity plants, military bases (naval and for weapons testing), infrastructure facilities and of course citizens who want to live and relax near the coast.

Looking forward, Israel has the highest birthrate in the OECD countries. In addition to the allocation of land for residence, the growth of the population requires public infrastructures, some of which must be located on the on the water's edge (power plants and ports). In this context, it is worth mentioning that since the 1980s new piers have been constructed in the Ashdod and Haifa ports (the Yovel port, the western pier in Haifa and the *Hamifratz* port) which involved draining the sea since there are no other possibilities for expansion. In addition, it should be mentioned that following the major discoveries of natural gas in Israel's economic waters in 2009 a lively public discourse took place on where to locate the connection of the gas pipeline to the coast. None of the municipal authorities agreed that the connection facilities would be located within their boundaries. This illustrated the extent of the land shortage along the coast, even when we are talking about essential national industrial and utility infrastructures.

1 Israel within the Green Line is in 29th place in population density; however, if one ignores city-states (such as the Vatican, Monaco and Hong Kong) or islands with small populations and territories (San Marino, Nauru, and Tobelo), Israel rises to 20th place.

One of the possible solutions to the shortage of land and one that is commonly implemented abroad is to transfer some land uses to the sea and onto artificial islands.

A number of comprehensive studies have been written about the creation of artificial islands in Israel, most of them already in the 1990s, within the framework of the Chaikin Chair for Geostrategy at Haifa University and the surveys carried out by various government ministries. The government of Israel has even made several decisions on the issue: Decision 2709 from November 10, 2002 regarding the establishment of a steering committee of ministry directors to examine the possibility of creating an artificial island for residence, recreation and tourism off the coast of Israel; and Decision 4776 from June 17, 2012 to investigate the feasibility of creating artificial islands for clusters of industrial and utility infrastructure. In addition, the Ministry of Energy published a policy paper in 2007 on artificial islands for industrial and utility infrastructure.[2]

It appears that the public and academic discourse has reached a basic consensus regarding the planning need and the technological feasibility of creating relatively small artificial islands (tens of dunams) to be used for industrial and utility infrastructure, while taking into careful consideration the issue of environmental protection. Indeed, in 2012, the government of Israel approved Decision 4776 regarding the "Investigation of the feasibility of creating artificial islands for clusters of industrial and utility infrastructure".[3]

The introduction to Decision 4776 makes clear that the motive for the feasibility study is the need—in view of the natural gas discoveries—to create facilities that will enable the receiving, processing and transmission of natural gas to the national distribution network.

The position of the writers of the Maritime Assessment for Israel is that the government should adopt the solution of floating islands for industrial and utility infrastructure and should choose a multipurpose solution from among the variety of possible engineering options, one that will combine elements that are already in use or in the stage of active planning in other parts of the world, while giving careful consideration to the issue of environmental protection, from the perspective of possible pollution and the movement of sand along Israel's coast.

2 Policy paper on artificial islands for infrastructure http://moin.gov.il/SubjectDocuments/Chof27.pdf

3 Government Decision 4776 from June 17, 2012 http://www.pmo.gov.il/Secretary/GovDecisions/2012/Pages/des7446.aspx

The advantages of artificial islands for infrastructure:

- Saving of expensive and sought-after coastal land.
- Distancing of hazards and sources of pollution from residential concentrations.
- Release of land that is today taken up by infrastructure or essential facilities, in order to make room for future urban development.

The technology of building artificial islands

It is not the intention of the document to present a full survey of all the existing technologies, but rather to mention the main ones and to assess their suitability for our region. In general artificial islands can be divided into a number of categories:

Artificial islands near the coast (the territory becomes the new shoreline or the islands are have a permanent connection to the shore)

- The draining of land: This is the oldest method/technology and has existed for centuries. In general, the use of this method requires the closing in of the drained area by means of a rigid structure such as a breakwater made of stones and filling of the internal area. The use of this method is possible in shallow water and requires a major quantity of appropriate filling material (with the appropriate compression so as not to dissolve in seawater).
- Use of caissons: This is a new technology based on the casting of concrete pools/compartments that are placed one on top of or beside the other and then filled with filling material or with seawater, sunk and anchored to the sea floor. This method is already in use in the construction of piers the new ports of Haifa and Ashdod. This method is also feasible only in shallow water and requires, in addition to the filling material, facilities for producing the caissons.

Facilities on pillars

- This is an existing technology that puts down pillars ("feet") on the seabed. The platform is positioned on these "feet" and is raised or lowered hydraulically or is even floating. Most of the oil and gas drilling and production facilities that are close to shore use this technology. Its advantage is the speed with which it can be built and the extensive experience that exists in the building of similar structures. Its disadvantage is its dependency on water depth and the limited area that is available for activity. Due to the limit of water depth, most of the platforms are located under the horizon line and are visible from the shore and therefore it can be assumed that there will be public opposition to their construction.

Islands that are not dependent on location and are not limited by water depth

- Floating islands: This is a new/old technology based on existing technologies and their specific modification to each task. It mainly requires planning and conceptual flexibility and makes use of existing and proven elements, such as the construction of huge ships, the laying of underwater electricity cables, etc.

Suitability of the technology to the situation in Israel

Islands created by draining the sea are not practical in Israel since it does not have the quantity nor the quality of material needed in order to build artificial islands in the open sea on a scale that will support industrial plants. The only deposits of sand in the region that can be used as filling material are located in northern Sinai and would require the import of sand from Egypt. It is difficult to imagine this happening in view of the internal political opposition that it would arouse in Egypt against the sale of "Egyptian soil" to Israel. An instructive example is the experience of Singapore which has been importing filling material for an ambitious draining project for several decades. The filling material is brought from Malaysia and Indonesia. Whole mountains have "disappeared" from the Malay peninsula and the northern islands of the Indonesian archipelago, which have then been used to drain the sea in Singapore. Even though there are neighborly relations between the countries, the issue from time to time becomes a source of tension.

Floating artificial islands for energy infrastructures

The idea of a floating island was first raised as a solution near the coastline for a specific engineering problem. The first "islands" were barges that were used as jetties for loading and loading of ships at anchorages where there was no harbor. These rafts quickly became storage facilities for liquids (such as water and fuel) or goods. The installation of various machines on these barges, such as pumps, cranes, winches and drilling machines, transformed them into work areas or small factories. With the increasing manpower and scale of operations of these "factories", along with the allocation of residential areas for the manpower, the barges became "islands", which grew according to changing needs. The current oil and gas rigs grew to significant proportions, from several dunams (3,000–5,000 square meters) to tens of dunams (10,000-20,000 square meters) and even more. Thus, they can certainly be called islands, without quotation marks.

The discovery of offshore oil and the need to extract it, first at shallow depths and later in deep water, led to the development of offshore technology, which

involved the finding of technological solutions to problems such as anchorage and tying down of heavy equipment in deep water, maintaining a stationary position at sea, use of appropriate standards during construction, deciding on appropriate ecological standards, etc.

At the same time, the size of ships was also growing. Today, ships that are 300–350 meters long, with a displacement of hundreds of thousands of tons are not a rare sight, whether they be oil tankers or some other kind of ship. Furthermore, there is a revival in passenger ships for recreation, which have grown to displacements of hundreds of thousands of tons and which sometimes carry infrastructures that can maintain a whole city. They can perhaps be considered to be inhabited floating islands.

The planning concept to build an artificial island for energy infrastructure

The most prominent characteristic of any floating island that has already been planned (whether or not it remained on the drawing table) is their design for one defined task. There are artificial islands (platforms) that are designed for the drilling of oil or gas, islands for power plants, islands for the storage of liquids and islands for the handling of natural gas. But as far as we know, and even though the parts of the engineering puzzle are used separately, there is currently no island with a variety of industries, which include an entire energy system.

The reason may be the price of a single island and/or the cost of planning. Without a specific and defined request from the customer, there are currently no companies that possess an "off-the-shelf" integrated solution, since the customer is in general a company in a specific field. A producer of natural gas, for example, will order an island with facilities for the production of gas while an electricity producer will order an island with a power plant, and so on.

We claim that from an engineering perspective, all parts of the puzzle in building an artificial island for energy infrastructures already exist and have been implemented in numerous locations around the world (such as in giant ships, in facilities for electricity transmission by means of underwater cables, in facilities for the production of gas, etc.), such that the concept of a floating artificial island for infrastructure opposite the coast of Israel is certainly worthy of serious consideration.

Examples of plans for floating infrastructure islands

One of the characteristics common to the planned facilities is their enormous size, which in some cases exceeds 500,000 tons.

The island appearing in the illustration serves as a gas handling facility near the production field and as a loading facility onto an LGT ship. The island essentially serves as a hub for the production network from the various wells dispersed throughout the field and it has the ability to regulate production.

The first island of this type was built in China by PETROBRAS, the national fuel company of Brazil.

Status: active
Diameter: about 110 meters
Displacement of 230,000 tons.

Figure 12.1 The planner: The ASA Sevan Marine Company from Norway.

There are various versions based on the same basic plan including power plants run that burn natural gas, tanks for storing natural gas and fuels, etc. Nonetheless, there is still no plan for a multipurpose island.

The island in the illustration is an example of a planned floating island for the storage of gas.

Figure 12.2 Ship/island for the processing of natural gas, including liquefaction facilities and loading onto natural gas tankers.

The following illustrations are examples of the planning of a floating "island" that includes a facility for gas production and a facility for liquefaction and loading onto LNG tankers. This island was meant to be the largest of its kind in the world. Ordered by Shell International which is under Anglo/Dutch ownership in a consortium with the Korean Samsung Industries, which was also meant to build it.

Length: 480 meters
Width: 74 meters
Displacement: 500,000 tons

Figure 12.3 Facility for gas production and a facility for liquefaction and loading onto LNG tankers.

Intended to exploit the Prelude gas fields in northwestern Australia. Planned annual production when the facility is fully operational would be 3.6 million tons of LNG annually.

Advantages:

The plan enables the exploitation and production of gas fields in distant locations on a very large scale, regardless of the water depth.

Disadvantages:

Since the "island" is meant to operate in the open sea, it must survive and function in a storm with high waves. The standard for such an "island" is a level 6 typhoon. This requirement, together with the requirement to produce 3.6 million tons of LNG, has determined the size of the "island". This in turn determined its price, which was estimated at $12 billion. It is no surprise that execution of the project is highly dependent on the global price of oil/gas.

Status: The project was halted due to the steep drop in global oil/energy prices during the last two years.

Transmission of electricity by underwater cables

The connection of the island to the shore and the national transmission system will be accomplished by means of existing and proven technologies. The technology for the transmission of electricity by means of underwater cables already exists and is becoming increasingly popular. Following are several examples of existing cables and of cables in the planning stages or are being laid:

Table 12.1 List of main underwater cables for transmission of electricity (in use and planned)

Name of cable and its point of connection	Voltage	Length of cable	Status
Westernlink UK. Scotland/England	600 kV DC	400 km	Being laid
Romulo between continental Spain and the ilsnad of Majorca		250 km	Being laid
SA.PE.I. (Italy) Sardinia/Italy Mainland	500 kV DC	434 km	Active
TransBay Cable USA San Francisco, California	200kV DC	85 km	Active
Messina Straits Crossing Italy, Sicily/Italy Mainland	380 kV AC	43.5 km	Active
Phu Quoc Island connection, Phu Quoc/Vietnam Mainland	110 kV AC	58 km	Active
Basslink (Australia), Victoria/Tasmania	400 kV DC	300 km	Active

Integrated multipurpose and multitask solution

Artificial Floating Mega Platform AFloMeP – We propose the consideration of a floating mega platform, which will include a combination of existing elements that have been shown to work successfully in other countries (although not in an integrated manner as proposed here).

This artificial floating island will bear an entire energy complex. Rather than transporting the natural gas from the new fields northwest of Haifa to onshore processing facilities and from there to the national gas network, as is currently planned, the gas could be transported directly to an artificial island near the field. The island will be used both as a processing facility and as a hub for the various wells. On the island, there will be a power plant that burns natural gas. The electricity can be transmitted to shore by underwater cable, which will be connected to the national grid or to the European grid by way of Cyprus. In addition, the island can also include a desalination plant that will use the excess energy produced by the two energy facilities for gas production and electricity production. The following illustrations depict the floating multipurpose artificial island for national energy infrastructures:

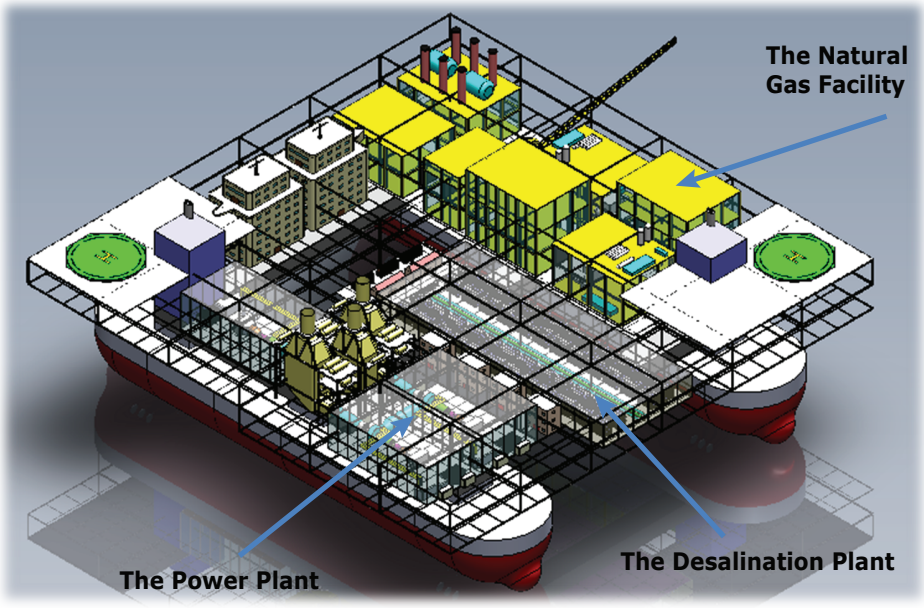

Figure 12.4 Artificial Floating Mega Platform AFloMeP*

The island will include the following:

- Three integrated power plants, each of them producing 350MW for a total of 1050MW.
- A desalination plant with annual capacity of 15 Mm^3.
- Gas processing plant.

Advantages:

- Saving of land, primarily in the coastal area.
- Distancing of safety hazards from population centers.
- Optimal location of the island which will facilitate the export of electricity to Cyprus and from there to the European grid.
- Shortening of transmission lines for the gas.
- Cheaper energy prices to the consumer: Location of energy facilities on a single platform lowers the cost of production per unit of energy, thanks to the reduced losses from transmission of the gas and the elimination of the need for a liquefaction/gasification plant. In this model, the issue of cooling, which is essential for both the power plant and the desalination plant, can be dealt with on the spot. This eliminates the need for an intake pipe and diffusion pipe for the desalination plant and the regulation of electricity production according to consumption – the desalination plant can serve as a reserve for periods of high consumption on land.
- Planning flexibility: In a different version of the AFloMeP, petrochemical refineries can be located on the island, which in the future will make it possible to free up land in Haifa Bay, which is currently used for essential but polluting petrochemical industries, for urban use.

Location of the AFloMeP at sea

In principle, there is no technical constraint on the location of the proposed platform, since it is floating and its height is planned to be that of a significant wave[4] (9.5 meters). Any location with a water depth of 35–40 meters is suitable from the perspective of displacement. The platform includes a self-positioning mechanism so that it is not dependent on water depth for anchoring.

4 Significant wave: mean height of the highest one-third of waves.

The location of the platform has economic, political, security and also social/ employment significance and therefore its geographic location must balance between the following factors:

- Proximity to gas field – shortening of gas transmission pipeline.
- Proximity to coast – shortening of electricity transmission cable and easier transport of desalinized water.
- Proximity to an existing port – to create continuity of supply and for techno logistic support.
- Proximity to a naval force or alternatively the possibility of anchoring near the naval force that will guard the platform.
- It is desirable that the platform be located beyond the horizon line from the viewpoint of an observer on the shore (in order not to disrupt the sea view).
- Existence of enough space for additional platforms for the building of an energy archipelago in the future.
- Proximity to countries with export potential for the platform's output.
- Preference for location in Israel's territorial waters and of course in Israel's economic waters.

It appears that the location of the platform on the boundary of Israel's territorial waters—about 20 km northwest of Haifa or about 20 km west of the Ashdod-Ashkelon line, satisfies most of the criteria.

Floating platforms and terminals for natural gas near the coast of Israel

Israel Natural Gas Lines Ltd. is responsible for the unloading and transmission of natural gas to customers in Israel. The company currently has three unloading terminals, two of which are on land (Ashkelon and Ashdod) and one of which is offshore with a floating terminal (Hadera).

The two terminals in Ashkelon and Ashdod are modified for natural gas and are connected to the gas pipelines from the nearby fields, from Egypt and from the Thetis fields (Ashkelon) and the Tamar fields (Ashdod).

Receiving terminal for liquefied natural gas opposite Hadera

This is a floating platform connected by a flexible pipe to the national gas supply line, with gas brought in by a rigid underwater pipeline of about 8 km in length. The floating platform is anchored to the sea floor by means of eight chains and anchors. The length of the chains allows the movement of the platform on a vertical axis and also within a certain diameter on the horizontal axis. A special ship for transporting the gas is connected to the platform by means of an opening in its hull. The gas flows through the opening and the terminal and undergoes heating/gasification (since the gas is stored on the ship in liquid form). It then flows into the national transmission system and from there to the various customers (primarily the Israel Electric Company).

The facility was built by Micoperi, an Italian Company for APL, a Norwegian company. There are two additional floating platforms of this type in use worldwide. The system is operational.

Advantages:

- The facility is relatively distant from the shore although it is under the horizon line.
- The unloading of the gas is done underwater, which increases safety.

Disadvantages:

- The system needs a particular type of natural gas ship that is equipped with an opening in its hull.
- The system provides a solution for one problem only: the unloading of natural gas.

Chapter 13: Marine Archaeological Assets

Assaf Yasur Landau

In the Mediterranean Sea, opposite the coast of Israel, there is an abundant treasure of cultural and heritage assets which have national and international importance. These assets are unique in that they embody a continuum of at least 8,000 years of human activity related to the sea. The structure of Israel's coast has led to the preservation of exceptional assets, including sunken Neolithic villages, the cargo of Canaanite ships, remains of ports, cargo from the Iron Age (the period of the Monarchy) and ships and ports from the Roman period up to the Ottoman period. Marine archaeology deals with all remnants of the cultural and material heritage, from the coast and out to the open sea, including port facilities, sunken ships, parts of cargo and sunken prehistoric villages. Marine archaeology is interested in remains from periods that are defined by law as ancient (before 1700 A.D), as well as remains with historical value from later periods (such as remains of ships from the 19th century and even the 20th century, including ships used to smuggle immigrants to Israel which have historical-national value).

The issue of preserving the marine cultural heritage along the coast of Israel is today at a crossroads. The development of maritime and coastal infrastructure, including the gas infrastructure, desalinization plants, and accelerated construction along the coast (despite the protection of the law[1]) creates a situation in which cultural assets are in danger in many areas, including the coastal region, the territorial waters, the Contiguous zone and the economic waters of the State of Israel.

In contrast to the ecological system, cultural assets are not renewable and cannot be rehabilitated. When they are destroyed, there is irreversible damage to our ability to learn and to reconstruct the history of Israel and of the Eastern Mediterranean.

The state of knowledge

Israel is one of the pioneers in underwater archaeological research. During the last fifty years, a great deal of data has been gathered on the cultural heritage and the underwater archaeological sites in our region. This knowledge includes the following categories:

1 Law for the Protection of the Coastal Environment, 5774-2004.

- Sunken ships
- Ports and anchorages
- Sunken prehistoric settlements

Unfortunately, this knowledge is restricted, almost exclusively, to the coastal area, up to a depth of about 15 meters. In contrast, the level of knowledge declines at greater depths and even more so in the case of sites of ancient sunken ships in most areas of Israel's territorial waters and all of its economic waters. Even by optimistic estimates, for only 10 percent of the territorial waters and less than 1 percent of Israel's Contiguous zone and economic waters is there systematic knowledge based on an archaeological survey. This situation is described in two recent policy papers on maritime planning: Maritime Spatial Planning for Israel[2] and Policy for Israel's Maritime Domain in the Mediterranean.[3] These documents are based on underwater surveys and archaeological digs carried out in recent decades and they present information primarily on sites near the coast and its immediate vicinity. The two documents emphasize the severe lack of knowledge regarding sites in deeper water. This is a critical constraint on any planning process within Israel's maritime domain.

The inclusion of accumulated knowledge in the Policy Document for the Management of Coastal Waters published by the Ministry of the Interior in 1999 led to the mapping of heritage and archaeological sites according to the importance of their preservation within the variety of considerations to do with the development and preservation of the coastal environment. Currently, we do not have sufficient knowledge for such an integration of heritage and archaeological sites within the future planning of the adjacent and economic waters of Israel.

The international element

The UNESCO Convention on the Protection of the Underwater Cultural Heritage (2001) set down the principles for protecting the assets of the maritime heritage both in the economic waters and beyond. Israel, along with the US and other countries, chose not to join the Convention and it is hard to imagine that the complex relations with UNESCO, as well as the content of the Convention, will change to an extent that will enable Israel to join the Convention in the foreseeable

2 The Center for Urban and Regional Studies, the Faculty of Architecture, the Technion http://msp-israel.net.technion.ac.il

3 Policy for the Maritime Doman of Israel in the Mediterranean, Ministry of the Interior. http://www.moin.gov.il/Subjects/merchav-yami/Pages/allreka.aspx

future. Nonetheless, even without joining the Convention, academic and non-government bodies can join a UNESCO body involved in marine archaeology called the Network for Underwater Archaeology (UNITWIN) whose members included universities in the US, Australia, Japan, Egypt and Turkey.

Another international convention that is related to the marine cultural heritage is ICOMOS, an international body that works for the protection of cultural heritage. The organization has a branch in Israel that operates as a non-profit organization. Alongside this convention, there are best professional practices for the protection of marine heritage. An example of such a code is the document of principles that was the result of two conferences on the preservation of maritime heritage: at Brock University in October 2009 and at Pennsylvania University in March 2010. The document is referred to as the Penn-Brock Statement and represents a consensus reached by researchers at leading universities in the US, Britain, Canada, Turkey and Slovenia, as well as experts from the Antiquities Authority in Israel. The document presents the ethical and research goals of marine archaeology and the protection of the underwater cultural heritage. De facto, the document serves as the guide for practice in underwater archeology.

The geopolitical environment in the Eastern Mediterranean makes it difficult for Israel to be part of regional initiatives related to maritime heritage. Thus, for example, Israel was prevented from participating in the Mare Nostrum project of the EU, which includes collaboration between Lebanon, Greece and Italy. The project is creating a heritage trail between the coastal cities of the Mediterranean along the sea routes of the Phoenicians and allocates significant resources to the training of local tourist guides, the creation of tourist attractions and the establishment of museum exhibits.

In Egypt, the archaeological authority underwent an upheaval following the replacement of the Supreme Council for Antiquities by a government ministry in which the unit for marine archaeology does not have an official status. Most of the underwater activity in the country is carried out by foreigners. This activity, in addition to the political challenges in the relations between Israel and Egypt hinder Israeli-Egyptian collaboration on archaeological matters.

Gaps in legislation and regulation

Currently, there is no declared policy for the preservation of antiquities within Israel's economic waters. This is primarily because the Antiquities Law (5728-1978) protects antiquities in Israel's territorial waters and Contiguous zone

only. The antiquities in the economic waters, including remains of ancient ships with great scientific value, are vulnerable. Damage to these remains can occur unintentionally or as a result of negligence during the development work on the gas fields or other maritime infrastructure or even as a result of intentional damage as part of commercial exploitation for purposes of profit. Therefore, effort should be invested in setting down a policy that will protect the antiquities in Israel's economic waters, through the use of rules derived from international conventions and best practices.

Commercial marine salvage of antiquities

The search by the US navy for the Dakar submarine led to the discovery of two Phoenician ships from the 8th century BCE at a depth of 400 meters in the economic waters of Egypt. The ships were studied and mapped by Robert Ballard and Lawrence Stager and archaeological artifacts that were 2,750 years old were lifted from the ocean floor. This scientific archaeological research demonstrated the huge potential of archaeology at depths beyond diving level and outside of territorial waters.

The appearance on the scene of organizations that have the ability for marine salvage at great depths and also the desire to find antiquities for commercial purposes is not a question of time but in fact already exists. In December 2015, for example, the ship Explorer Odyssey arrived in the Eastern Mediterranean to search for and salvage undiscovered artifacts. The ship is operated by the Odyssey Marin Exploration Company (Nasdaq: OMEX) and has already located and salvaged archaeological artifacts from ancient ships. It is possible that one of the goals of the voyage was to find the huge treasure that was lost with the sinking of the Napreid in 1872. The Odyssey Explorer, which has capability for deepwater salvage, has carried out operations in the waters between Cyprus and Lebanon which have been described by the company as having an archaeological nature. The ship was stopped in Limassol on December 24th, 2015 on suspicion that the ship contained antiquities from Cyprus and/or from Lebanon's economic waters. The search led to the seizure of 57 plastic crates containing 5888 artifacts from the 18th century that belonged to an Ottoman ship. The ship was finally released in January 2016 and continued on to Beirut.

The development of the natural gas fields and other infrastructures in Israel's territorial, adjacent and economic waters

When there is an alleged conflict between marine heritage and the development of coastal infrastructure, a solution can almost always be found which will enable the research of the archeological remains that are at risk. Thus, in the case of the wooden ship from the 17th or 18th century that was discovered during the expansion of the port of Haifa, it was decided that the construction work on the northern breakwater would be carried out in a way that would leave the location of the ship accessible for an archeological dig, which will be carried out soon by the Antiquities Authority.

Nonetheless, the accelerated development of maritime infrastructure during the last decade has raised the problem that we do not have practical archaeological information on cultural heritage assets, and primarily on sunken ships, at depths of greater than 15 meters. In cases where infrastructures and structures are built at diving depth within territorial waters, the Antiquities Authority carries out an investigation for the presence of antiquities, as in the case of the underwater survey carried out along the route of the El Arish-Ashkelon gas pipeline, which went up to a depth of 40 meters. However, when carrying out a survey there is currently no obligation that a representative of the Antiquities Authority or an archeologist be present on the ship carrying it out. This is particularly problematic in the economic waters which are beyond the territorial waters. Although the environmental surveys that are carried out by energy companies are to be found at the Ministry of National Infrastructures and are available (in part of in full) on the Ministry's site, in the vast majority of cases the surveys do not relate to archaeological elements and it is in general not possible to know what scientific method was used to search for the archeological remains, whether a designated survey was done and if so by what means. The result is a significant lacuna in the law and the regulations regarding archaeological surveys, which prevents the effective protection of cultural heritage assets in economic waters, and which does not impose sanctions on an entity or private individual that harms antiquities in these areas.

Conclusions and proposed solutions

Foreign relations and security: The ability of the State to protect cultural treasures within its borders has important implications on the way it is viewed

by the international community. This situation exists despite the politicization of UNESCO in declaring sites as being at risk. Protection of antiquities is a good indicator of the strength and organizational ability of a country, while doing systematic harm to antiquities or the lack of a policy to protect them is one of the leading characteristics of a failed state.

Currently, Israel has good relations with Cyprus and Greece. They can be strengthened even further through collaboration between the scientific communities in the study of marine cultural heritage. Since the universities in the three countries are budgeted by the government, it is important that the first step toward large-scale collaboration be taken by the governments.

Planning and the environment: Currently, Israel's knowledge of archaeological sites beyond the shallow depth of 15 meters is anecdotal. As mentioned, it is estimated that systematic information based on an archaeological survey exists for less than 10 percent of the territorial waters and for less than 1 percent of the Contiguous zone and economic waters. Knowledge is not sufficient for any kind of planning beyond the immediate coastal area. It would be worthwhile that any strategic maritime planning in the future regarding Israel's economic waters will include components that will constitute the basis for a national plan for the discovery, protection and nurturing of the maritime cultural heritage.

Use can made of several elements of the UNESCO Covenant in future planning, even if Israel is not signed on it and primarily elements from within the operative work plan that accompanies the Covenant, as well as elements from the national plans of other states (such as the Spanish national plan, Green Paper 2009 and elements of British research in marine archaeology).

An outline that relates to the place of archaeology and the protection of cultural heritage within a maritime strategy for Israel, which also includes policy measures, has already been presented as part of Maritime Spatial Planning for Israel. The plan emphasizes the importance of protecting the national treasures in deep water, in the territorial waters, in Contiguous zone and in the economic waters. Similarly, the plan emphasizes the organization of existing information on the subject and making it accessible to researchers and the public, as well as the strengthening of supervisory bodies in order to deal with the new challenges of working in the vast territory of the ocean and in deep water.

The gap in knowledge can be bridged, at least partially, by means of a sampling survey to be carried out in several areas within the territorial waters and the

economic waters of Israel, with the goal of understanding the potential antiquities sites located in these huge areas. It is proposed that three areas of 20X20 km be investigated by means of sonar and other means of long-range detection. The sites that are discovered can be investigated by a Remotely Operated Underwater Vehicle (ROV). This is a fairly large-scale project, but is feasible even by means of the existing scientific infrastructures in Israel. It is important that the survey be carried out without dependency on parties with an economic interest. At the same time, the enforcement ability of the Antiquities Authority should be reinforced on two levels:

- Acquisition of independent capabilities for working and supervising in deep water and at major distances from the coast.
- Close supervision, accompanied by appropriate technological means, of work actually being carried out.

Regarding lacunae in the regulations, the US provides an example of how the problem can be solved. It implements the principles of the UNESCO Convention even though it is not a signatory. The most immediate solution is to implement the principles of the Convention by means of regulations that will apply to Israel's economic waters (an area where the Antiquities Law does apply). The regulations would be derived from the Convention or best professional practices to preserve the maritime heritage.

It is recommended that these regulations will expand the supervisory powers of the Antiquities Authority in Israel's economic waters. These powers should be applied starting from the stage of the environmental survey (in other words, a representative of the Antiquities Authority should be present on the vessel carrying out the survey) and up to, and including, the laying of the infrastructure in areas were ancient remains are found. The regulations should prevent the possibility of commercial exploitation of antiquities in the economic waters and should permit scientific archeological work only.

Economic: Archaeology has economic potential as well, primarily based on tourism. In 2013, for example, 670,000 people visited the national park in Caesarea. It is reasonable to assume that less than one percent dived in order to view the ancient sunken port of Caesarea, even though there is a diving club on the site.

North of Caesarea is the Tel Dor National Park, which is going through a facelift. The bays near the tel have plentiful archaeological remains and there are two diving clubs, one in Nahsholim and one in Habonim. Here also only a small number of visitors arrive to dive at the site. The development of infrastructure for the exhibition

of marine archaeology will facilitate the expansion of tourism at these sites and will create additional jobs in the area, including diving instructors, restaurants, hotels, etc. Egypt, for example, has understood the tourist potential of marine archaeology. Following the underwater archaeological discoveries in Alexandria, which include spectacular underwater remains of Hellenistic architecture, there is advanced planning for building a huge underwater museum in collaboration with the UN. The museum will be a global tourist attraction, second in Egypt only to the pyramids.

Chapter 14: Israeli marine ecosystems: interactions between humans and marine biota – state of the sea 2016

Dror Angel

There are numerous human activities that take place in Israeli coastal and offshore waters and all of these interact with the resident biota. The ecosystem interactions include physical, chemical and biological components and the following review will focus on how human activities affect the marine environment by changing or impacting these components.

Israeli eastern Mediterranean (Levant) and Red Sea waters are considered "oligotrophic" (low in the nutrients that drive marine productivity) and one of the characteristics of such waters is the low biomass and fairly high diversity of the resident biota. Changes in the physical and chemical properties of oligotrophic waters will, by default, generally lead to changes in the biological communities, often expressed as a shift in the species composition and in relative abundances of these species. There is a delicate balance between the inanimate properties of the marine environment and the biota, which evolved over millennia, forming a highly diverse assemblage of benthic and pelagic organisms. Marine ecologists generally agree that diversity begets stability and resilience, and biodiversity (and changes in biodiversity) is often used as the major indicator of a healthy or an unbalanced marine ecosystem.

Both the eastern Mediterranean and the Gulf of Aqaba are geologically active areas, which form numerous underwater habitats, including deep sea canyons, kurkar ridges, expansive sand flats, cold seeps, etc. These diverse habitats and the unique underwater conditions (high temperatures and salinity) are believed to have led to the evolution of specialized, unique and diverse biological communities. In addition, there has been an influx of large numbers of exotic species into the Mediterranean and one of the world's hotspots for invasive species is in the Levantine Basin.

Activities that affect the physical integrity of some of the aforementioned habitats, especially the soft bottom (sand and mud) communities, include massive and historical projects such as the Aswan dams and the Suez Canal. More recent activities of this sort, albeit at much smaller scales include the installation and mooring of an assortment of: underwater cables, pipes and gear related to transport of natural gas and oil from the deep sea to shore-based facilities,

etc. Another activity that took place for many years until it was outlawed was the mining of sand and of a variety of hard-substrates, mostly for construction purposes. A related activity which is still ongoing is beach nourishment, whereby eroded sandy beaches are replenished artificially by dumping huge amounts of sand, usually from sea, onto the shore and the shallow sub-tidal region. This takes place both on the Israeli Mediterranean and Red Sea (where it is entirely artificial) shores. Additional activities that have a physical effect on the marine environment include other coastal construction projects, such as the construction of marinas, commercial ports, breakwaters, promenades and other structures. The most heavily populated urban areas in Israel and elsewhere around the world are generally in proximity to the sea, and as a result, one of the limiting factors along the Mediterranean coastline is space. A solution to this problem that has been discussed for several decades is the construction of artificial islands, which will change the current coastline drastically and will probably create a variety of environmental and ecological problems that will need to be addressed.

All of the activities listed above affect the shallow as well as the deep water biological communities that occupy and rely on the habitat that they have evolved into. The recent law forbidding construction in the 100m strip, from the water line to the east, on the Mediterranean coast was passed to help protect both the intertidal and subtidal habitats, as well as the biota that are affected by changes in this region. Although new construction in this narrow strip is rare, lighting of promenades and other facilities is common and conflicts with the natural light-dark cycles of the biota that occur in the coastal zone, adding light-pollution to the already large list of stressors. An activity that has a direct negative effect on some benthic Mediterranean communities is trawl fishing which alters habitats by scraping the seafloor, netting all macrobiota and at times even hard substrates that occur in the epi-benthos.

Another class of physical trauma that marine animals are exposed to is acoustic (noise) pollution caused by coastal and submarine construction, shipping, naval activity, deep sea exploration using a variety of acoustic methods and other commercial activities. The impact or influence on fish and marine invertebrates has not been explored, yet the cause of numerous dolphin and whale strandings on Mediterranean shores as well as internal injuries to sea turtles over the years is probably related to noise-trauma.

There are several large seawater-cooled power plants on the Mediterranean Israeli coast, and the marine area affected by thermal trauma due to these is local and limited. A bigger problem, unrelated to human activities along the Israeli coasts is

climate change which has caused Mediterranean seawater temperatures to rise by >1° C over the past 25 years; several times faster than the global average (EEA 2015). This temperature rise has had wide-scale effects on many taxa, causing some species to become extinct and some to flourish. Future forecasts anticipate additional temperature increase that should facilitate the arrival and colonization of invasive species from the Indo-Pacific region. Additional climate change effects forecast for the next century include a large rise in the frequency and intensity of storms that will wreak havoc on our unprotected coastline, especially the coastal cliff and kurkar ridges and their inhabitants.

Climate change also affects the chemistry of the sea. The continuous rise in the concentration of carbon dioxide in the atmosphere is expressed in the ocean as a decrease in the pH of seawater. Whereas scientists once thought that changes in ambient pH affect only organisms that undergo calcification, such as corals and molluscs, it has become clear that environmental pH values affect the physiology, metabolism and survival of non-calcareous organisms too. Many indigenous species have declined as a result of a combination of competing invaders, changing environmental conditions and damage to habitat. Although the eastern Mediterranean is world-famous for being hyper-oligotrophic, the coastal zone is polluted by land-based activities such as urban sewage, urban and agricultural runoff, industrial effluents, polluted groundwater discharge and atmospheric emissions (industry, transportation, fires, etc.).

Although most marine pollution may be traced to terrestrial sources, there is also marine pollution that is related to maritime activities. Dredging often releases toxins, as does mining for and extraction of hydrocarbons and minerals from the seafloor. Acting under MARPOL, the International Convention for the Prevention of Pollution from Ships, the Israeli Ministry for Environmental Protection has implemented numerous actions to reduce marine pollution at sea, yet limited enforcement and monitoring prevent this source from becoming trivial, though new monitoring technologies show promise.

There is a huge list of chemicals that enter the sea but not all of these are pollutants; only those that cause some form of (mainly biological) damage. Among the classes of pollutants there are the non-toxic organic compounds, e.g. sewage, that cause marine bacteria to multiply and deplete the oxygen in sediments or the water column; the damage is a hypoxic or anoxic area where all aerobic organisms die or migrate from. Such events are still comparably rare in the well oxygenated coastal waters of Israel.

Five desalination plants along the Mediterranean coast of Israel release large volumes of brine and of other compounds used in the desalination process into the sea. The extent of damage caused by the release into the sea of the byproducts of desalination is debatable. Because of the unique situation in Israel, where there are few sustainable alternatives to a reasonable supply of freshwater desalination is a topic of national security.

Another pollutant that is strongly related to our current lifestyle is plastic. Plastic polymers are the dominant type of solid waste in the sea, ranging in size from macro to micro-particles, commonly known as microplastics. Microplastics are currently found worldwide in all seas, at all depths and are thought to cause a wide array of biological and ecological effects. The effects include smothering, choking, strangulation, starving – all which may cause death to the affected organism, and a wide array of sub-lethal effects, including dietary imbalance, exposure to heavy metals and toxic organic compounds (POPs), endocrine disruptors, etc. Plastics have been found in a huge list of vertebrate and invertebrate animals examined and there is concern that these animals and their predators (as well as humans) are exposed to the pollutants adsorbed onto the plastic particles. Although plastics are recognized as a major form of marine pollution, and numerous programs have been established to address this problem, there are few practical and realistic programs to effectively reduce the abundances of plastics at sea and their constant flux to the marine system. Plastics are also thought to be an important vector for various diseases and for invasive species.

In addition to being one of the most oligotrophic bodies of water, the Levant has some of the highest numbers of marine invasive species. Many exotic species from the world oceans reach the eastern Mediterranean via a long list of transport mechanisms. Most of these do not survive, however those that do and become established may compete with, prey upon and exclude endemic species. The decline in many indigenous Levantine species is probably the result of multiple-stressors acting in concert. Changes in temperature, water chemistry, pH, resources and habitat may all contribute to the survival or extinction of a species.

One of the outstanding examples of a successful invasion in the eastern Mediterranean is the scyphomedusa Rhopilema nomadica. This rhizostome jellyfish was first described in Israeli coastal waters in the 1970s and has been recorded annually since then, generally forming massive swarms every summer. These swarms impact many human interests, including mainly recreation and tourism, and also fishing, power-plant cooling water, and desalination operations. Although they have not been quantified, these jellyfish blooms most likely affect

many ecosystem functions including the composition and abundances of micro and mesoplankton, availability of food for larval and juvenile finfish, etc. On the positive side, the jellyfish also appear to provide important habitat and may even serve as a food source to some commercial finfish species, and entrepreneurs have proposed pharmaceutical and biomedical products that can be produced from this and other jellyfish species.

Several hypotheses have been formulated regarding the apparent success of this species. The warming eastern Mediterranean environment appears to suit this species that was limited to the Levant for several decades, but has migrated westward over the past decade; recorded in Tunisia and Malta is recent years. Several researchers have suggested that overfishing in the eastern Mediterranean exerts strong pressure on finfish - one of the main competitors of the jellyfish – and that placing limits on fishers may balance the situation, thereby increasing completion between finfish and jellyfish. This hypothesis may be tested if fishing moratoria and bans are enforced. Another hypothesis focuses on the success of polyps – the benthic stage in the jellyfish life cycle – which rely heavily on surfaces. This hypothesis states that as the area of artificial submerged marine substrates increases, coincident with massive development and sprawl in the coastal zone and solid waste pollution, the area available for jellyfish larvae to settle on increases and facilitates further blooms. Although they make sense, these hypotheses have yet to be studied and tested, especially with respect to the local situation, in the eastern Mediterranean.

One of the activities that may be impacted by stinging jellyfish is marine aquaculture. In the eastern Mediterranean, mariculture consists mainly of finfish farmed in net cages and there have already been several instances of aquaculture fish-kills related to jellyfish blooms in the western Mediterranean. Aquaculture has traditionally been criticized by environmentalists as an activity that is unsustainable, but it appears that blanket statements are unjustified as local conditions vary radically from site to site and site-specific features are often the major factor determining the sustainability of this sector. In the Israeli coastal zone, classical net-cage farms are scarce due to the extremely exposed nature of this coast and large-scale submersible cage systems using single-point mooring and other anchoring systems are being developed as a viable alternative.

In light of the above, there are several things that may be done to protect, maintain and conserve the marine environment and marine ecosystem services that we are interested in. These include:

- Develop a set of standards to protect the marine and coastal environment, to match ongoing activities as well as anticipated initiatives.
- Create several marine protected areas that protect nature, especially sensitive and unique habitats.
- Empower existing teams of regulators and watchdogs, at the national level, to ensure the marine environment is monitored and protected.
- Establish a plan to develop energy resource exploration and extraction based on environmentally sustainable principles .
- Develop strategies for sustainable fishing, e.g. reduce trawl-fishing and encourage development of pelagic fisheries.
- Establish strategies for sustainable aquaculture in Israeli coastal waters.

Chapter 15: Management of Israel's Maritime Zones – An Overview of the Legal Framework

Nadia Tzimerman adv.

the following chapter is based on a report from within the Israel Marine Plan prepared at the Technion.[1]

Introduction

Until the end of the 20th century, most of Israel's activity in the Mediterranean occurred in its coastal waters (territorial Sea) up to 12 nautical miles (about 22 km) from the coast. However, during the past decade, as a result of the discoveries of natural gas in the Israeli Exclusive Economic Zone (known as economic waters), accelerated activity began in the development of the Israeli maritime space (including drilling, building of facilities and laying of pipeline). Israel's maritime space extends over an area of about 27,000 square kilometers, which is larger than Israel's dryland territory. Currently, there is drilling activity at a distance of more than 100 km from the coast in deep water (more than 1,700 meters) and underneath the ocean floor (to a depth of over 6 kilometers). This development creates new challenges for Israel, which require not only security, technological and professional adaptations, but also legal ones, which will constitutes the basis for the planning of sustainable policy that will prevent environmental disasters such as that which occurred in the Gulf of Mexico.

In contrast to the global trend in recent years, whose goal is the development of integrated marine spatial planningbased on ecosystem-based management and integrated coastal zone management,[2] Israeli policy is still primarily sectoral. This

1 The Israel Marine Plan was written at the initiative of a group of researchers and planners at the Center for Urban and Regional Studies of the Faculty of Architecture and Town Planning at the Technion and was intended to integrate, accompany and support the parallel processes of planning, legislation, research and teaching of the sea in the State of Israel, both now and in the future. Participating in this initiative were professional consultants in a variety of maritime fields, both from Israel and abroad, and also a broad forum of interested parties (representatives of government ministries and government bodies, environmental organizations, municipalities and representatives of the business sector with an interest in the sea) who were part of the plan's preparation during its various stages. The plan can be found at http://msp-israel.net.technion.ac.il

2 See Robin Kundis Craig, Comparative Ocean Governance: Place-Based Protections in an Era of Climate Change 91–111 (2012). Among the tools commonly used today to implement this trend is the declaration of marine protected areas (MPA) and marine spatial planning (MSP). This policy is also reflected in institutional regulation, including the creation of regulatory frameworks with a broad and holistic view of marine management.

policy results in regulatory chaos, in which numerous authorities are responsible for different aspects (sometimes conflicting) of the same marine environment. Each has its own narrow perspective and there is no clear order of preferences. Furthermore, there is high degree of uncertainty in all aspects of legislative regulation of activity in Israel's EEZ. This uncertainty has broad economic, regional and international consequences.

The United Nations Convention on the Law of the Sea (UNCLOS) from 1982 (herein: the Convention) serves an international maritime constitution, whose role is to specify the rights and obligations of nations in the various maritime regions. It creates a framework for the management, protection and sustainable development of the maritime environment and its resources. The Convention entered into force in 1994 and since then has been ratified by 166 nations (including Lebanon, Egypt and Cyprus).[3] Israel is not signed on the Convention but has declared more than once that it "accepts upon itself the customary provisions of the Convention, including those that relate to the maritime zones."[4]

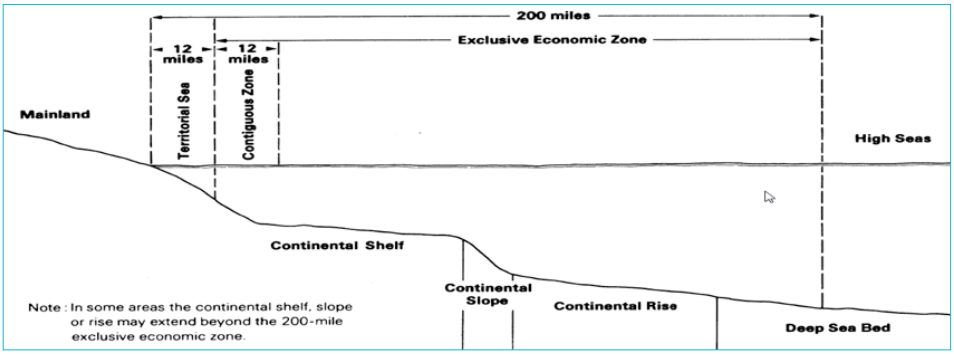

Figure 15.1 Maritime Zones (Churchill and Low 1999).

Baselines

The baselines are the lines that extend along a county's coast from which is measured a country's costal waters or territorial sea (defined below). The other maritime zones are also measures from the baselines. The Convention defines the two methods for determining the baselines: the normal baseline and the straight baselines.

3 As of January 10, 2014, www.un.org/Depts/los/reference_files/status2010.pdf

4 See the preface to the draft of the Maritime Zones Act 5773-2013 page 4. See also the agreement between the government of Israel and the government of Cyprus regarding the delimitation of the EEZ from December 17, 2010.

Section 3 of the Interpretation Law, 5741–1981 specifies that the "coastal waters" (territorial sea of Israel) extend from "the low water point on the coast". In other words, in the current legal situation, the baseline for measuring maritime zones is the normal baseline. Nonetheless, according to the words of explanation of the Maritime Zones Bill, 5775–2014 (herein: Maritime Zones Bill), there is a desire to change the system to one of straight baselines. It appears that policy makers in Israel are aware of the fact that the geographic characteristics of Israel's coast are not suited to the system of straight baselines according to the Convention. However, according to the Bill's words of exlanation, Israel is basing itself on the practices of neighboring countries in the region.[5] Figure 15.2 illustrates the straight baselines for Israel.

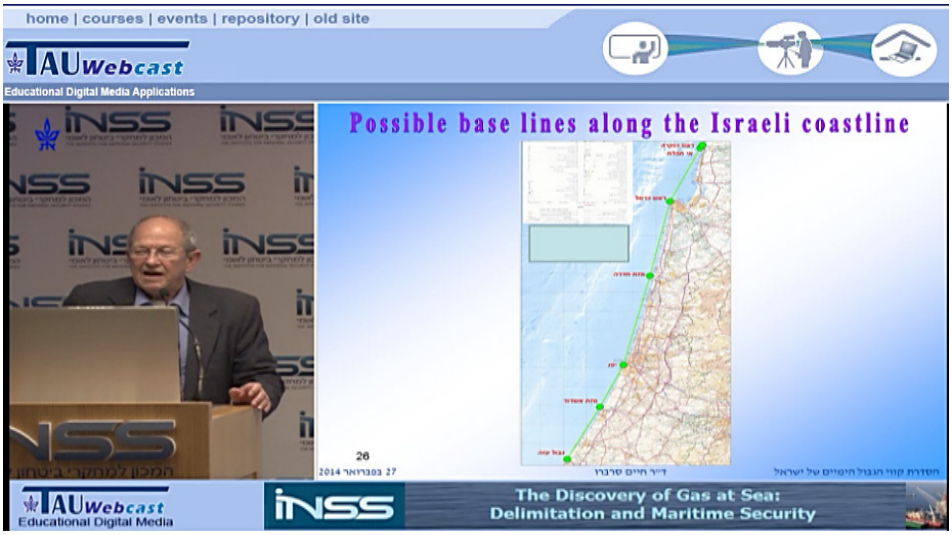

Figure 15.2 Possible straight baselines[6]

If and when Israel changes the system for drawing the baselines there it will be necessary to examine the implications for the delimitation of Israel's maritime zones, the agreement with Cyprus, the dispute with Lebanon on the delimitation of the EEZ and other issues. In addition, it should be taken into account that the

5 It should be mentioned that Israel has not yet published the actual coordinates between which the baselines will be drawn.

6 According to Dr. Haim Serbaro, Director of the Israel Mapping Center, at the conference of the Institute for National Security Studies, February 27, 2014.

determination of straight baselines requires a public declaration that is liable to meet with opposition from neighboring states.[7]

Territorial Sea

The territorial sea is a strip of the Mediterranean Sea adjacent to Israel's coast, which stretch for 12 nautical miles westward from the baselines. In this territory, Israel has complete sovereignty, including over the airspace above it, the water column, the seabed and the subsoil. In this zone, foreign countries have the right of innocent passage of sea vessels, which do not disturb the peace or security of the coastal nation.

Over the years, Israel has expanded its territorial sea and they currently extend to 12 nautical miles from the low water mark (covering an area of about 4000 square kilometers).[8] Section 3 of the Interpretation Law, 5771–1981 defines "coastal waters" as an open sea strip along a country's' coast, with a width 12 nautical miles from the low water point on the coast." In Israel there are no additional laws that regulate the territorial sea.[9]

A relevant issue in this context is the delimitation of the territorial sea between neighboring countries. Article 15 of the Convention specifies that neighboring countries are not permitted to expand their territorial sea to beyond the "median line"[10] except in the case of an agreement between the nations, historical title or special circumstances. Article 16 of the Convention states that the state must give due publicity to the charts of a scale or the list of geographical coordinates of its territorial sea and deposit a copy with the Secretary General of the UN.

7 In this context, it is important to mention that Israel signed and also ratified the Geneva Convention that specifies almost identical principles with respect to baselines.

8 The Coastal Waters Act, 5717–1956, expanded the territorial sea from three to six nautical miles and the Coastal Waters Act (amendment), 5750–1990 extended them to 12 nautical miles.

9 Thus, for example, the existing definition does not relate to the airspace or the seabed and subsoil of the strip of open sea and also not to the rights of innocent passage for foreign nations.

10 "...the median line every point of which is equidistant from the nearest points on the baselines from which the breadth of the territorial seas of each of the two States is measured." For other system to determine the median line see: ABLOS (2006), A Manual on Technical Aspects of the United Nations Convention on the Law of the Sea – 1982 (4th ed.)

Israel declared in 2011 its northern maritime boundary, but has yet to declare the southern one.[11]

Contiguous Zone

The contiguous zone is the strip extending for an additional 12 nautical miles beyond the territorial sea (i.e. to 24 nautical miles from the baseline) and it must be declared in order to be recognized. This zone is not part of the state's territory; but the state can exercise the control necessary to prevent infringement of its customs, fiscal, immigration or sanitary laws within its territory.In addition, the state has jurisdiction over an archaeological and historical artifacts found on the seabed in this zone. Israel has yet to declare its contiguous zone. The contiguous zone is part of the EEZ (defined below) and therefore the rights, jurisdiction and duties the state has in the EEZ also apply in the contiguous zone.

Exclusive Economic Zone

The EEZ ("economic waters") extends for 200 nautical miles beyond the baselines, or up to a distance determined in an agreement with another coastal country. In this zone, the state does not have full sovereignty, but rather sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources (living or non-living) of the waters superjacent to the seabed and of the seabed and its subsoil, and with regard to other activities for the economic exploitation and exploration of the zone, such as the production of energy from the water, currents and winds.

In addition, the state is given the authority required to realize its rights, such as establishment and regulation of installations and artificial islands and also exclusive jurisdiction over such installations, with regard to customs, fiscal, health, safety and immigration laws, and the power to determine a safety zone around them with a radius of up to 500 meters. The state also has powers for conservation and utilization of living resources and the right to engage in scientific research and to protect the marine environment. In parallel to these rights, the state has the duty to preserve the ocean environment and living resources. All states enjoy certain freedoms in the EEZ, such as freedoms of navigation and overflight, and laying of submarine cables and pipelines, Israel has not yet declared its EEZ.

11 Decision 3452 of the 32nd government: "Determination of northern maritime delimitation of the coastal water and the exclusive economic zone of the State of Israel in the Mediterranean" (July 10, 2011) pmo.gov.il/Secretary/GovDecisions/2011/Pages/des3452.aspx. The decision was submitted to the UN.

Continental shelf

As in the EEZ, a state exercises in the continental shelf only sovereign economic rights to explore and exploit natural resources (although only on the seabed and its subsoil) including mineral and other non-living resources, as well as sedentary species on the seabed. The state has the exclusive right to regulate drilling on the continental shelf.

There is an overlap between the continental shelf and the EEZ of up to 200 nautical miles from the baselines, regardless of the geological characteristics of the continental shelf. However, a nation that is interested in extending its continental shelf to beyond 200 nautical miles (not relevant in Israel's case) must demonstrate geological continuity. Although practically there appears to be an overlap between the EEZ and the continental shelf with respect to seabed and subsoil rights, these are still two different regimes. The main relevant different for our purposes is that the rights on the continental shelf (up to 200 nautical miles) are not conditional on a declaration of the continental shelf. In contrast, the state is required to publicly declare its EEZ. Thus, there is the possibility of a continental shelf without an EEZ but not an EEZ without a continental shelf.

Delimitation of Israel's EEZ and continental shelf in the Mediterranean

The short distance between Israel and Cyprus does not allow the two countries to exploit the full 200 nautical miles that is specified in the Convention for the EEZ and the continental shelf. In addition, Israel's EEZ is bordered on the north by Lebanon and in the south by the Palestinian Authority and Egypt. In cases of overlap between the EEZ's and continental shelves of two or more countries, the Convention specifies that the matter should be resolved by an agreement between the countries that is fair and just.[12] In the event that such an agreement

12 See articles 74(2) and 83(2) of the Convention: "The delimitation… between States with opposite or adjacent coasts shall be effected by agreement on the basis of international law… **in order to achieve an equitable solution**." This formulation is a convenient compromise for the countries, since it permits negotiations over the delimitation of desired boundaries and is applicable according to the circumstances of each case. States can determine the method for arriving at an agreement that is desired by them (and can also take into account geological structures and geographic characteristics). Nonetheless, it appears that countries generally adopt the median line as the starting point of negotiations. For a review of the various methods, see: Nugzar Dundua, Delimitation of maritime boundaries between adjacent States (United Nations – The Nippon Foundation Fellow 2006–2007).

is not reached, the matter will be resolved by the procedure for settlement of disputes set out in the Convention.[13] Since Israel is not signed on the Convention, the option open to it is to determine the boundaries by means of agreements in accordance with international law.[14]

In order to determine its maritime boundaries, Israel relies on a number of bilateral agreements in which Cyprus is a party (the Cyprus-Egypt agreement from 2003[15] and the Cyprus-Lebanon agreement from 2007 which was not ratified by Lebanon[16]). The agreement signed between Israel and Cyprus in 2010 is tangent to these agreements (as can be seen Figure 15.4 – coordinate 12 in the south and coordinate 1 in the north).[17] Meanwhile, article 1(e) of the agreement states that points 1 and 12 are not conclusive points and that they can be changed in a future agreement between the three relevant countries. In addition, article 3 of the agreement requires a Party that negotiates the delimitation of its EEZ with another State to consult the other Party prior to reaching a final agreement if the such delimitation is in connection with coordinates 1 and 12.

13 Part 15 of the Convention specifies the procedure for settelment of disputes. Article 287 of the Convention list four different possibilities for resolution of conflicts in the absence of an agreement between the countries, where in the absence of agreement over the desired procedure the default will be *special arbitral tribunal* (article 287(5)).

14 It should be mentioned that article 6 of the Convention on the Continental Shelf (1958) specifies a different solution for the delimitation of the continental shelf. It states that the rule is an agreement between the countries and in the absence of such an agreement the median line will be the boundary between them. It should be mentioned that Israel and Cyprus ratified this Convention but not Lebanon and Egypt. https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXI-4&chapter=21&lang=en

15 Agreement between the Republic of Cyprus and the Arab Republic of Egypt on the Delimitation of the Exclusive Economic Zone (17 February 2003). A copy of the agreement appears on the UN website: www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/TREATIES/EGY-CYP2003EZ.pdf

16 This agreement did not go into effect and therefore not only are its instructions not binding on Lebanon and Cyprus, they have no validity for a third party (such as Israel). On the status of the agreement with respect to Israel see: E.S. Abu Gosh and R. Leal-Arcas, *Gas and Oil Explorations in the Levant Basin: The Case of Lebanon and Israel*, Oil, Gas & Energy Law Intelligence (2013); Martin Wählisch, *Israel–Lebanon Offshore Oil & Gas Dispute – Rules of International Maritime Law*, 15 ASIL Insights (2011).

17 Agreement between the Government of Israel and the Government of the Republic of Cyprus regarding delimitation of the Exclusive Economic Zone dated December 17, 2010. The agreement was ratified in Government decision 2794 from February 3, 2011. The agreement appears on the UN site: www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/TREATIES/cyp_isr_eez_2010.pdf

Figure 15.3 Appendix 2 to the agreement between Israel and Cyprus

This situation creates uncertainty with regard to the boundaries of Israel's EEZ. Israel depends on Cyprus as an "anchor", while Cyprus itself is subject to diplomatic attack in this context from Turkey. In addition, the arrangement between Israel and Cyprus with regard to the point of the northern boundary (coordinate 1) is not recognized by Lebanon, while the delimitation of the northern maritime border is a subject of international dispute. Figure illustrates the dispute between Israel and Lebanon.

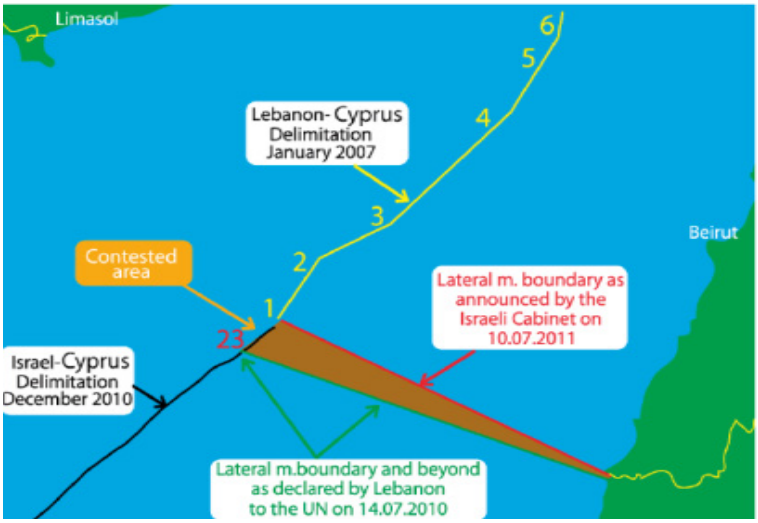

Figure 15.4 The boundary dispute with Lebanon (the disputed area is about 850 square meters)

The lack of certainty with respect to the delimitation of Israel's maritime boundaries has not only political and security implications, but also economic one (since Israel refrains from granting petroleum exploration licenses in the disputed area).

Which law applies to Israel's EEZ and continental shelf?

Currently, apart from the Underwater Territories Law, 5713–1953, there is no law in Israel that deals with the EEZ or the continental shelf. This situation is meant to change with the passage of the Maritime Zones Law, the legislative process for which began several years ago.[18]

The question arises as to which laws apply in Israel's EEZ. Do the planning and building laws apply in this zone? And what is the status of the antitrust laws, the environmental protection laws, the labor laws and the tax laws in the EEZ? It should be recalled that in contrast to territorial sea in which Israel has full sovereignty and all of its laws apply, in the EEZ the country has only limited sovereign rights. Essentially, there is currently no legal certainty regarding which laws apply in Israel's EEZ. From time to time, Israel decides to apply one law or another based on interpretation, but there are no set guidelines. The Maritime Zones Bill was meant to introduce order in this context, including the application of Israeli law; however, the legislation has been delayed. This reality creates legal chaos that harms public interests.

The issue brings up the question of the basis on which the government can decide to apply certain laws in Israel's EEZ.

Currently the government bases its authority to apply certain laws in the EEZ primarily on the interpretation of an old law from 1953—the Underwater TerritoriesLaw which includes only one paragraph:

1. *(a) "**The territory of the State of Israel** shall include the seabed and subsoil of the underwater territories adjacent to the coast of Israel, which are beyond the territorial waters, wherever the depth of the water above them allows the exploitation of natural resources in those territories."*

   (b) "Nothing stated in subsection (a) shall affect the characterization of the water above these underwater territories and beyond the territorial waters of Israel, as high seas."

According to a legal opinion published in January 2013 by the Assistant Attorney General, Avi Licht,[19] the interpretation of the Underwater Territories Lawin the

18 Two previous drafts of the Law were published in 2008 and 2011.

19 "The law applying in maritime zones", opinion of the Assistant Attorney General (Economic-Fiscal), January 15, 2013.

spirit of the Convention leads to the conclusion that Israel has the authority to apply a particular laws in its EEZ.[20]

Maritime environmental management in Israel

The Convention provides a framework for the protection of the marine environment and the management of ocean resources, which imposes obligations on nations and sets down general principles, while leaving the detailed regulation to specific international and regional conventions and local legislation. This allows countries to adopt various management approaches. In the past, countries have adopted management methods that are characterized by sectoral management, i.e. focus on specific sources and uses (fishery management, management of resources such as oil and gas, the regulation of shipping and commerce, protection of certain species, prevention of pollution from certain sources, etc.). In recent decades there has been a shift toward integrative management methods that are based onecosystems.

In Israel, the numerous uses of the maritime environment are regulated by a large number of authorities (the Ministry of Agriculture, the Ministry of Transportation, the Ministry of Health, the Ministry of Energy, the Israel Nature and Parks Authority, municipalities, etc.). The Israel Marine Plan mapped 15 different regulators that are connected to the management of the maritime environment in Israel.

From the regional point of view, the recognition of the economic, social, ecological and cultural value of the Mediterranean marine environment and of the threats to it, have led the Mediterranean nations to take on joint responsibility and management of the Mediterranean region as part of the Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean.[21] The Convention is intended to achieve the sustainable development of marine and coastal resources and sets out principles for cooperation, with the goal of protecting the marine environment and encouraging scientific and technological development... To this end, the parties agreed to apply the precautionary principle

20 The opinion discusses environmental legislation, tax laws and petroleum laws. However, this is not a close-ended list. According to the opinion, each legislation needs to be considered on its own.

21 Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (1995). The original convention from 1976 was called Convention for the Protection of the Mediterranean Sea Against Pollution, and already from the name one can see that the amended Convention adopts the more integrative approach. The amended convention from 1995 entered into force in 2004. Israel is signed on the Convention and ratified the amendments in 2005.

and the polluter pays principle; to undertake environmental impact assessment; to promote integrated management of the coastal zones; to utilize the best available techniques and the best environmental practices; and to cooperate in the formulation and adoption of the protocols.

According to article 1, Barcelona Convention applies to the entire maritime waters of the Mediterranean Sea (without distinguishing between the different maritime zones). The application of the Convention may be extended to coastal areas and protocols may extend its geographical coverage (for example, on the seabed and subsoil of the continental shelf).

The parties to the Convention are obligated to adopt environmental legislation that implements the Convention and its protocols, to facilitate transparency and involvement of the public in the implementation of the Convention and to use any means necessary to implement the Mediterranean Action Plan (MAP), which is meant to specify practical steps for the implementation of the Convention and its accompanying protocols.

Conclusion

Israel must shift to an integrated marine spatial planning that involves ecosystem-based management and integrated coastal zone management, in contrast to the existing sectoral policy, in which at least 15 regulators operate in the maritime space with only partial coordination.

The lack of legal certainty regarding the application of Israeli law to the EEZ of Israel has economic and other implications (environmental standards, work safety) for the natural gas companies and others that operate in this domain The State of Israel must create legal certainty in its maritime zones, first and foremost by promoting the Marine Zones Bill, 5775–2014.

The lack of clarity regarding the boundaries of Israel's EEZ—in the north due to the dispute with Lebanon and in the south due to the lack of a declaration on the matter—has economic implications in the context of natural resources that perhaps are located in these areas (Israel has refrained from issues licenses for exploration in these areas), and also additional aspects, such as shipping, fisheries, marine agriculture, security, etc.

Following is a table listing the protocols of the Barcelona Convention and their implementation in Israel:

Name of the protocol	Legal Status in Israel	Implementation in Israeli legislation
Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources and Activities – 1980 (amended in 1996, the amendments entered into force in 2008).	Ratified the original protocol in 1991 and the amendments in 2009.	Prevention of Sea Pollution from Land-Based Sources Law, 5748-1988 and its regulations.
Protocol for the Prevention of Pollution in the Mediterranean Sea by Dumping from Ships and Aircraft – 1976 (amended in 1995; the amendments have not yet entered into force t).	Ratified the original protocol in 1984. Amendments have yet to be ratified.	Prevention of Sea Pollution (Dumping of Waste) Law, 5743-1983 and its regulations.
Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean – 1995 (entered into force in 1999, replaced the original protocol from 1982).	Ratified the original protocol in 1987.	National Parks, Nature Reserves, National Sites and Memorial Sites Law, 5758-1998 and its regulations.
Protocol Concerning Cooperation in Preventing Pollution from Ships and, in Cases of Emergency, Combating Pollution of the Mediterranean Sea – 2002 (entered into force in 2004).	Ratified in 2014.	Draftof the Preparedness and Response to Incidents of Oil Pollution of the Sea and the Coastal Environment Law, 5772-2012.
Protocol for the Protection of the Mediterranean Sea against Pollution Resulting from Exploration and Exploitation of the Continental Shelf and the Seabed and its Subsoil – 1994 (entered into force in2011).	Signed Not yet ratified	
Protocol on Integrated Coastal Zone Management in the Mediterranean – 2008 (ICZM) (entered into force in 2011).	Ratified in 2014	Protection of the Coastal Environment Law, 5764-2004.
Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal – 1996 (entered into force in 2008).	Not signed	

Chapter 16: Marine Planning in Israel

Yael Taf-Seker

During the last two decades, the sea has become an increasingly important factor in Israeli society and in the economy and security of Israel. This trend began in 1999, the year that the Noa natural gas reservoir was discovered in Israel's economic waters, and intensified with the discovery of Leviathan in 2010. This discovery increased the awareness of the government and the public sector of the need for marine planning, with the goal of balancing between the various needs of Israel's society and economy in the use of the maritime domain.

These needs require consideration of various elements: the production of natural gas, energy independence, security threats (such as terror), the need for clean water (by means of desalination) and space for recreation and heritage, as well as shipping lanes and seaports, through which flow the vast majority (more than 98 percent) of Israel's imports and exports. The aforementioned requires special consideration in the marine planning process. However, the State of Israel does not currently have an overall marine plan, spatial or otherwise, for the Mediterranean. This is particularly felt in relation to deep water and Israel's economic waters (i.e. waters starting from a distance of 12 nautical miles from the shore).

Spatial marine planning is primarily an internal process carried out by the state according to its laws and within a defined geographic domain with changing levels of sovereignty (i.e. territorial waters, economic waters, etc.). Nonetheless, it should be remembered that Israel's marine planning is not influenced only by the needs of Israeli users and is located within a broader ecological and geostrategic environment, as well as being influenced by the international legal environment which both guides it and limits it.

From a legal standpoint, Israel is not signed on the UN Convention on the Law of the Sea (UNCLOS), a fact that may influence the official international definition of its boundaries, as well as the character of solutions to conflicts and disputes regarding maritime boundaries. In addition, there is a boundary dispute between Israel and Lebanon (and the non-state player Hezbollah), a matter that affects marine planning in the region. The regional geostrategic challenges dictate specific security needs (such as the closing of sea territory and the guarding of the energy facilities). International shipping lanes are decided on and planned in coordination with and by notification to the International Maritime Organization (IMO).

From an ecological standpoint, Israel's maritime domain is located in the eastern part of the Mediterranean and is affected by the nature of this sea. The Mediterranean has unique ecological characteristics, because, among other reasons, it is a "closed sea". This fact creates complex ecological challenges. The Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean was organized by the United Nations Environmental Programme (UNEP) with the goal of protecting this unique region and is signed by numerous countries with Mediterranean coasts. This includes Israel, which is a party to the Convention and has ratified most of it protocols.[1]

This obligation has planning implications in the context of Israel's international commitment in the realm of the marine environment.

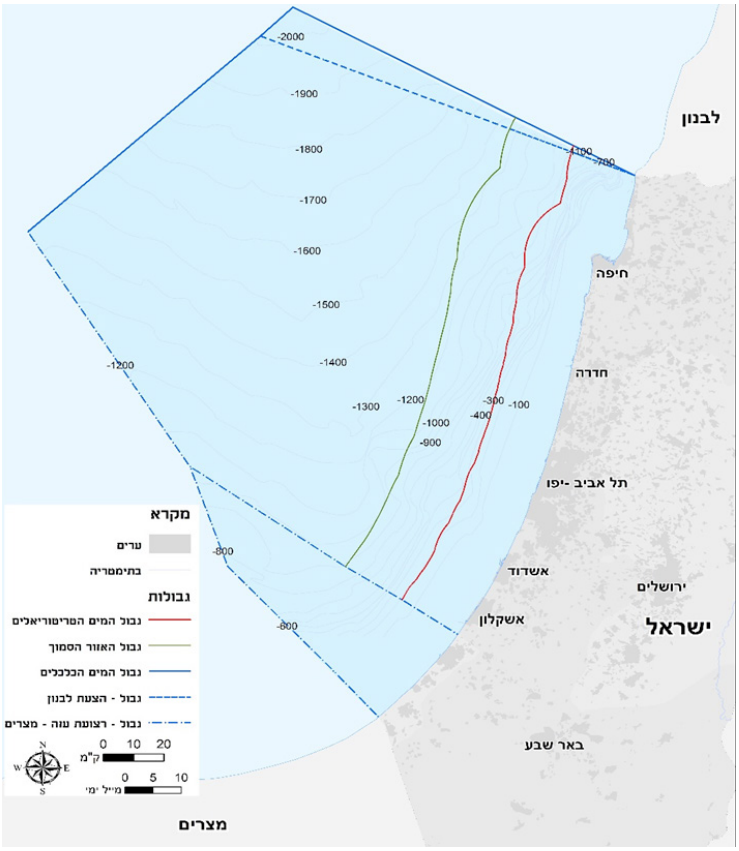

Figure 16.1 Map of Israel's marine domain

1 For further details on the protocols and the status of Israel's obligations, see the chapter on The Management of Israel's Maritime Domain – A Review of the Legal Situation.

The existing National Zoning Plans in Israel focus on building along the coast and the issue of beaches. Furthermore, the most recent relevant policy document—the Policy Document for the Coastal Waters (1999)—does not apply to Israel's economic waters. On the other hand, the proposed Maritime Zones Law (5774-2014) was submitted by the Ministry of Justice for the first time in December 2014. The law relates to the definition of the State's powers and those of the various government authorities with respect to Israel's maritime zones. The law has a direct impact on numerous planning and regulatory matters related to the Mediterranean and includes an approval process of a long-term policy document that will regulate the activities in the marine domain and will establish a special committee for natural gas in Israel's economic waters. The proposed law is still being amended and has not yet been passed by the Knesset.[2]

The Planning Authority, which in the past operated as part of the Ministry of the Interior and is today part of the Ministry of Finance, announced a marine planning process for the Mediterranean already in 2012, with the support of the Integrated Maritime Policy in the Mediterranean (IMP-MED) of the EU.[3] In 2014, an external planning workgroup was chosen in order to lead the Maritime Domain project. The Authority declared that this initiative is a direct continuation of Tama 13 (National Zoning Plan 13), the Policy Document for Coastal Waters (1999) and the Law for the Protection of the Coastal Environment (2004). The planned outputs of the process include a report that will include all of the existing knowledge on this issue and the formulation of principles for the regulation and management of the Mediterranean. Subject to these conclusions, the possibility will be considered for the comprehensive regulatory planning of the Mediterranean. At the end of 2015, the Planning Authority announced that it has completed two outputs as part of this planning project: (a) A comprehensive report that summarizes Israel's existing knowledge on the Mediterranean and its uses; and (b) a plan for the establishment of a national database on the maritime domain. As of 2016, the Planning Authority has yet to present a final maritime plan—whether political or spatial—for the Mediterranean.

2 The memorandum of the law, which provides the basic guidelines for the legislation concerning Israel's maritime zones, was publicized already in 2013. The memorandum defines Israeli maritime zones, including its economic waters, as well as the rights and powers of the State of Israel, based on international law, including the maritime boundary agreement with Cyprus. The memorandum lists the laws that will apply to marine facilities (both permanent and temporary), the environmental laws that will apply to the marine environment and also the laws related to the production of energy and to shipping.

3 Professional and consulting assistance only.

In parallel to the process of data gathering and planning by the Planning Authority, there is also an academic initiative called the Marine Plan for Israel (MPI), which is being led by a team of researchers from the Technion. In 2013, the Center for Urban and Regional Studies in the Faculty of Architecture and Urban Planning at the Technion began work on a Marine Spatial Plan (MSP). This process was based on academic marine research and included experts from academia alongside with other stake holders, including government representatives. As part of the process, a report was published on the existing situation in the Mediterranean. At the end of 2015, the Technion published a document of recommendations called a Marine Plan for Israel, which includes recommended policy measures for Israel's management of the Mediterranean and a spatial marine plan for this region. Even though there is currently no official collaboration between the Planning Authority and the Technion and even though the Marine Plan for Israel was not adopted by the government, each of the two bodies has been included in recent years as an interested party in the planning processes of the other and each is aware of the other's recommendations. Three additional government documents that were approved and published recently are particularly relevant to marine planning:

1. The conclusion of the Strategic Review of the Ministry of National Infrastructures, Energy and Water, which was carried out by Israel Oceanographic and Limnological Research (IOLR), whose goal is to examine the sensitivity of fisheries in Israel's Mediterranean domain (including those in deep water and in Israel's Exclusive Economic Zone) for the purpose of granting licenses to explore for offshore oil and gas (a draft was published for comment in July 2016).
2. Approval of the Petroleum Council for New Oil and Gas Exploration Zones in Israel's economic waters (August 2016) including the spatial division of possible exploration areas (see Figure 16.2).
3. Approval of National Zoning Plan 37h for the receiving and handling of natural gas from discoveries in the Mediterranean and delivery to the national transmission system (end of 2014).[4]

4 In 2016, and following the approval of the National Zoning Plan, the Leviathan partnership (Delek Drilling, Avner, Noble Energy and Ratio) submitted a plan for the establishment of infrastructures for the processing and transport of natural gas from the Leviathan reservoir, which would enable the production of natural gas and its transport to Israel by 2019. The plan was approved in June 2016 by the Commissioner of Petroleum in the Ministry of National Infrastructures, Entergy and Water.

Figure 16.2 Map of the blocs in the decision of the Petroleum Council[5]

Although these government documents advance the planning of Israel's Mediterranean waters to a certain extent, they relate only to the production and transport of oil and gas. Israel still lacks an overall plan that will clearly define Israel's uses of the sea, both existing and potential. Apart from energy, the other areas of activity include desalinization, shipping and ports, security and the military, coastal and maritime infrastructures (such as electricity production and underwater communication cables), fishery and marine agriculture, tourism, coastal and marine sports, culture and leisure, marine archaeology, etc. Other values that deserve attention are the environmental domain and the public-cultural domain, including considerations of prevention of pollution, preservation and rehabilitation of coastal and marine fisheries, preservation of public access to beaches and preservation of the coastal and marine landscape and its nurturing. The aforementioned still do not have an integrative planning solution, which will include a spatial plan and a comprehensive policy that takes into account all of the considerations related to the relevant marine uses and values.

5 The website of the Ministry of National Infrastructures, Energy and Water, August 10, 2016.

The planning situation in the Red Sea is different than that in the Mediterranean, since the Bay of Eilat is even narrower than the strip of Israel's coastal waters (even at the widest point under Israel's control, at Taba), a fact that creates a situation in which Israel has no economic waters under its control in Eilat Bay but rather only territorial waters. Within territorial waters, all of the laws and planning regulations apply and therefore there is no special situation in that region that requires replanning on a national level.

The subject of planning has significant economic aspects in the context of business continuity (regulatory stability was one of the main issues with regard to the Natural Gas policy Outline recently approved[6]) which will allow companies to plan long-term projects. Other issues of economic significance related to planning are the determination of shipping lanes to and from Israel, the definition of fishing and marine agriculture zones, etc.

This situation is to a large extent the result of the fact that the government approach to regulating uses of the Mediterranean has been sectoral rather than strategic, or in other words has lacked a overall perspective. During this period, each sector and marine use that became relevant was discussed and planned on its own, without a fundamental and integrative process that includes identifying the State's interests, determining marine policy according to those interests, approving a maritime strategy, and subsequently marine spatial planning of its various uses. It is preferable that such a process be carried out late than not at all. Therefore, it is important that at this stage, in which progress is being made in the planning of marine uses by various entities, a clear and overall marine strategy be formulated and that it will form the basis for laws, regulations and spatial plans in Israel's maritime domain.

6 See the chapter on the development of the natural gas fields following the delay in the approval of the Outline and other alternatives (import of liquefied natural gas).

Chapter 17: Maritime Piracy and Armed Robbery at Sea

Edward R. Lucas

Introduction

In 2016 the number of reported pirate attacks worldwide dropped to the lowest level since 1995. Despite this positive development, maritime piracy and armed robbery at sea still constitute a persistent threat to commercial shipping in a several regions of the world.[1] Piracy also puts seafarers at significant risk of injury and death. Thankfully, for the first time since 2005, no sailors were reported to have been killed by pirates last year. While no seafarers were killed, several were seriously injured and 62 were kidnaped, a three-fold increase from 2015.[2]

While Somali pirate attacks in the Gulf of Aden and western Indian Ocean have largely disappeared since 2012, pirates operating in Southeast Asia and West Africa continue to attack commercial ships on a regular basis. In 2016, the International Maritime Bureau (IMB) reported 191 actual and attempted pirate attacks globally. These included seven hijackings and 150 ships boarded.[3] The interconnected system of international maritime trade means that insecurity at sea can effect countries far-removed from the site of actual pirate attacks. While piracy does not directly threaten Israel's maritime security at present, any resurgence of piracy in the Red Sea or the western Indian Ocean could negatively affect trade through the Port of Eliat.

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1 The 1982 United Nations Convention of the Law of the Sea (UNCLOS) defines piracy as: *(a) any illegal acts of violence or detention, or any act of depredation, committed for private ends by the crew or the passengers of a private ship or a private aircraft, and directed: (i) on the high seas, against another ship or aircraft, or against persons or property on board such ship or aircraft; (ii) against a ship, aircraft, persons or property in a place outside the jurisdiction of any State…* Attacks which take place within the jurisdiction of a state are termed "armed robbery at sea." While this is an important legal distinction, for the sake of brevity, this report uses "piracy" to refer to attacks carryout in both international and territorial waters.

2 IMB, "International Maritime Bureau: Piracy and Armed Robbery Against Ships - Annual Report 2016"; IMB, "Piracy and Armed Robbery against Ships (1 January - 30 September 2012)"; IMB, "Piracy and Armed Robbery against Ships (2007)"; "ICC International Maritime Bureau: Piracy and Armed Robbery Against Ships - Annual Report 2005."

3 The International Maritime Bureau is a department of the International Chamber of Commerce. The IMB's Piracy Reporting Centre tracks pirate attacks worldwide. "International Maritime Bureau: Piracy and Armed Robbery Against Ships - Annual Report 2016," 7.

Global & Regional Issues

Today the two most pirate prone areas of the world are found in Southeast Asia – most notably Indonesia, Malaysia, and the Philippines – and the waters off Nigeria's Delta region. Fifty-four percent of all reported actual and attempted attacks occurred in this these two regions in 2016.[4] These regions also experience the vast majority of attacks carried out against commercial ships while at sea, as attacks in other parts of the world, such as Peru and India, typically only occur against ships in port or at anchor. Although Nigerian and South Asian pirates both attack ships at sea for private gains, they differ from one another in terms models of piracy employed. While the South Asian piracy model is to steal valuables from ships, West African pirates primarily employ a kidnap-for-ransom model.

Southeast Asia

The IMB reports 68 actual and attempted attacks in Southeast Asia in 2016. The majority of these attacks occurred in the waters around Indonesia. Most Southeast Asian piracy is relatively small-scale, with the majority of attacks are carried out against ships at anchor or alongside. In instances where pirates take control of a ship while it is at sea, their objective is usual to steal valuables, rather than hijack the ship itself. Once gaining control of the ship, these pirates loot easily portable valuables, such as electronic equipment, jewelry, and cash, before disembarking. Although in the past Southeast Asian pirates have stolen entire ships for resale on the illicit market, these large-scale attacks have been rare in recent years.

The fact that Southeast Asian pirates do not tipically kidnap crewmembers for ransom is a double-edged sword in terms of seafarer safety. Sailors are spared the dangerous and traumatic experience of being kidnapped; however, in some instances this can put crews at greater risk because pirates have no self-interest in protecting them.

Increased maritime security operations by local forces, such as the Indonesian Marine Police, as well as increased cooperation between regional actors, has led to a 53% decrease in the number of ships attacked in Southeast Asia in 2016, as compared to 2015. This decrease is driven primarily by a significant drop in the number of reported attacks in Indonesian waters (108 in 2015 vs. 49 in 2016). While this trend is encouraging, attacks in Indonesia have fluctuated significantly in the past. For example, in 2009 only 15 attacks were reported in Indonesian

4 Ibid., 5.

waters. By 2013 this number had risen to 106.[5] The high level of yearly variation in the number of attacks makes any long-term predictions about Southeast Asian piracy trends challenging.

Nigeria

There were 36 actual and attempted attacks attributed to Nigerian pirates last year. This is a more than two-fold increase from 2015. Unlike the Southeast Asian pirates, who are interested largely in stealing valuables, Nigerian pirates primarily operate a kidnap-for-ransom enterprise. While they will also take easily lootable valuables from ships, this is not their primary objective. In the past Nigerian pirates have also targeted tankers in order to steal oil, which they resell on the illicit market. There were no successful attacks of this type reported in 2016. [6]

Kidnapping is inherently dangerous for crewmembers. While pirates do have a self-interest in keeping hostages alive so that they can be ransomed, this fact does not shield sailors from injury and even death.

After declining in 2014 and 2015, last year piracy off Nigeria returned to 2013 levels, both in terms of the number of ships attacked and crewmembers hijacked. While the Nigerian government has the primary responsibility for combatting piracy in the Gulf of Guinea, its maritime security forces have been unable to tackle the problem. As a result, it is likely that piracy will persist in the Niger Delta until the root causes of piracy in the region – poverty, corruption, environmental degradation, and political instability – are addressed.

Piracy & Trans-national Terrorism

Because piracy and political violence can stem from the same political and economic root-causes, the fear of a nexus between terrorist organizations and piracy has been a longstanding concern. This fear was most acute in Somalia in 2008, when reports warned of a burgeoning "unholy alliance" between the terrorist organization al-Shabaab and pirates. Not only was it feared that terrorist groups could use the proceeds from ransoms to fund their activities, but that pirates would train terrorists to carry out attacks at sea. While such ties are hypothetically possible, in the case of Somalia it appears that these fears were largely unfounded,

5 IMB, "International Maritime Bureau: Piracy and Armed Robbery Against Ships - Annual Report 2013."

6 IMB, "International Maritime Bureau: Piracy and Armed Robbery Against Ships - Annual Report 2016."

as no such alliance came to pass. Currently, there is no evidence to suggest co-operation between pirates and trans-national terrorist organizations is likely to arise in any of the areas where pirates are active.

Piracy and Israeli Maritime Security

Maritime piracy does not pose a direct threat to Israel's maritime and economic security at this time. Piracy is practically non-existent in Mediterranean, with the last reported attack occurring in 2011 off the Libyan coast. Although Somali pirates have attacked ships in the Red Sea in the past, their operational range never extended west much beyond the Bab el-Mandeb – the narrow chokepoint separating the Red Sea and the Indian Ocean.

Although piracy is not of immediate concern, much of Israel's maritime trade passes through one of three strategic choke points: The Straits of Gibraltar; the Bosporus; and the Bab el-Mandeb. While the Straits of Gibraltar and the Bosporus have enjoyed decades of stability, vessels passing through the Bab el-Mandeb faced a serious threat from Somali pirates between 2007 and 2012. During this period several merchant vessels transiting from Asia to Europe even chose to bypass the region altogether and proceed via the Cape of Good Hope.

While Somali piracy is currently dormant, both Somalia and Yemen suffer high levels of political instability and poverty. Together with the advantageous physical geography, these are the conditions that allow piracy to flourish. If Somali piracy returns to the levels witnessed as recently as 2011, when more than 200 attacks were reported each year, or Yemeni pirate organizations were to come about, Israel's maritime trade could be affected. For example, increased shipping insurance rates could increase the costs of using the port of Eliat, including the overall cost of bringing oil to market through the Eliat–Askelon pipeline.

Chapter 18: Security of Maritime Energy Assets

Nir Zarchi

Introduction

Throughout modern history energy has been an essential basis of social prosperity and economic development and serves as a key component of the country's power and sovereignty.[1] Accordingly, many countries regard the maintenance of energy security – and in particular the aspects of reliability and continuity of supply – as key elements in their national security policy.

Over the course of recent decades, global dependence on energy has been increasing, leading to a substantial rise in demand and necessitating the development of additional or alternative supply sources. This need, along with the development of advanced detection, production and generation technologies, leads to the emergence of a **maritime energy economy**. At present, this economy represents the source of over 30% of all global energy[2] and this trend is expected to intensify over the course of the coming years.[3]

Since the 1999 discovery of the 'Noa' reservoir, large reserves of natural gas have been found offshore of the State of Israel, in the Exclusive Economic Zone (EEZ). These reserves serve as the central energy source for generating electricity in Israel and in the future they are expected to be one of the main energy sources for domestic transport and industrial purposes. Moreover, the intention is to export some of the gas reserves. Estimates indicate that the proceeds from these reserves will be a significant source of revenue for the national economy.[4]

However, along with the many opportunities inherent in the development of the maritime energy economy, significant challenges are emerging[5] regarding the

1 Dannreuther and Ostrowski, 2013

2 Kaiser 2007, Robertson 2013

3 It is quite possible that in the future the mid-sea will become the principal source for energy production, both from fossil sources and from renewable sources found in the sea, such as the kinetic energy of waves, or sources that in order to produce energy from them open spaces are required, such as solar energy or electricity produced from wind.

4 Bank of Israel. "*Bank of Israel's comments to the draft outline with regard to development of the gas fields discovered in the economic waters of Israel*",pg. 9. 2015.

5 It should be noted that damage to the energy infrastructure could be intentional (a terror incident for example) or unintentional (technical failure, natural force, etc.). The implications for the national energy economy, as well as the environmental implications, do not depend on the cause of the damage. Nevertheless, the present chapter discusses the intentional threat protection policy.

manner of coping with possible threats to the infrastructures found there, the potential economic implications of the resulting damage for the national energy economy, as well as the environmental implications.

Characteristics of the maritime domain and its existing security threats

The maritime domain has several unique characteristics which differentiate it from other domains, particularly the terrestrial domain. The main ones are: its physical size;[6] its low congestion – both in terms of human presence and in terms of the number of installations and facilities found there; its morphological characteristics and its geological features that differ from one another in its three layers – the subsea, the sea and the sea surface; and its special legal status, which is based on international treaties, such as UNCLOS and Freedom of the Seas, attempts to regulate with the aim of finding a balance between the whole spectrum of interests and needs of many different countries.[7] These and other characteristics have a considerable effect on the range and gravity of threats. In fact, the situation may provide attackers with advantages in reaching and attacking their target, while on the other hand preventing attacks in good time, or providing an adequate response during and after their occurrence, is very challenging.

The phenomenon of attacking maritime oil and gas installations is certainly not new. The first such attack took place more than a hundred years ago off the coast of the United Stated and involved the destruction of a rig.[8] Over the years there have been a significant number of security incidents involving maritime installations. In the last 25 years alone there were roughly 50 such incidents, which were perpetrated by diverse entities with a range of motives, objectives, capabilities and tactics.[9] Figure 18.1 shows the various types of threats and the threat realization process flow.

6 For example, roughly 71% of the earth's surface is covered by water (CIA, 2009). In the case of the State of Israel, its exclusive economic zone is slightly larger than its land area (Haifa Center for Maritime Strategy, 2015).

7 UNCLOS is a compromise between many interests of a variety of countries. In essence, it attempts to create a better state foothold in the waters. Nevertheless, a variety of issues, among them the piracy issue, were hardly addressed (Nyman, 2013)

8 The foregoing references an attack on an oil rig that was perpetrated on August 2, 1899 off the coast of Santa Barbara, California. The attack was perpetrated by a criminal organization and caused total destruction of the platform (Kashubsky, 2011).

9 Kashubsky, 2013

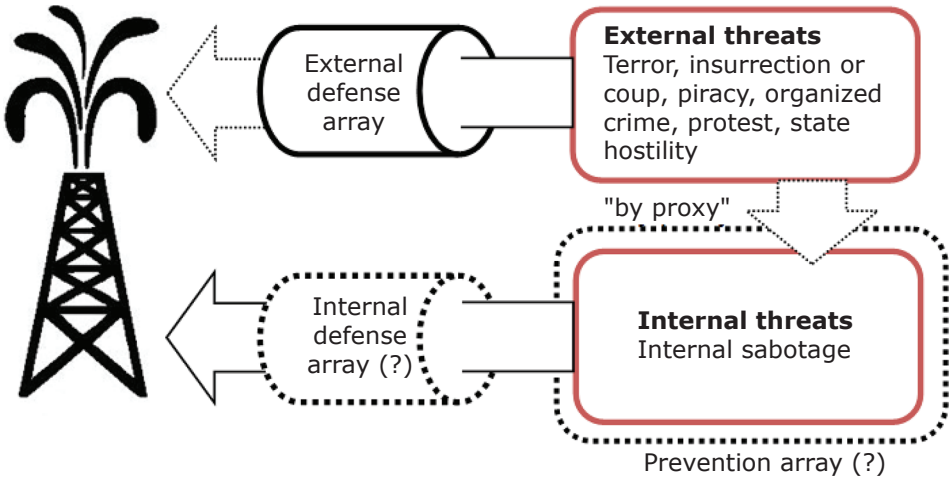

Figure 18.1 Groups and families of threats

Methods of protecting critical infrastructure in the maritime domain

Before dealing with the subject of critical infrastructure protection in general and in the maritime domain in particular, we must first define the target for protection, and consequently its extent and its manner of implementation. Protection targets can be classified according to two levels: tactical level targets – where the purpose is to prevent any damage to the critical installations themselves; and strategic level targets – where the purpose is to maintain critical interests at the systemic level and in the case under discussion, National Energy Security.[10] Therefore, the response for tactical level targets will generally focus on frustrating or preventing an attack, while the response for strategic level targets will also include elements of robustness – elements that give the system the ability to recover rapidly from shock and thus maintain a reasonable level of service in terms of of time-frames and cost-effectiveness.[11]

Tactical level protection targets include all those installations and critical infrastructures located in the maritime environment and in particular the energy installations, where the protection concept focuses largely on prevention and frustration of attacks. In cases of malicious internal threats, a variety of methods and tools can be used, for example to restrict the entry of unauthorized entities and to

10 It should be noted that there may be additional implications at the strategic level, apart from maintaining energy security, such as image or economic damage.

11 Sauser et al., 2011

create capabilities of identification and response to possible scenarios. Furthermore, it is possible to develop a system for coping with external threats that could include measures to create 'full situational awareness',[12] along with the ability to implement an operational engagement process that includes detection, identification, decision making and action (known as: 'OODA Loop'[13]). Thus, there is effectively an effort to maintain the functional continuity of the infrastructure components.

At the strategic level, the discussion of Israel's energy security is beyond the scope of the present discussion on the protection of maritime energy infrastructures. As a rule, a state's energy security is based on three elements: reliability of supply, affordability and sustainability.[14] Accordingly, the degree of damage to national energy security can be expressed in terms of the scale of the gas shortage in relation to demand in the domestic market and the duration of the shortage, and to examine the full range of methods and measures required in order to protect energy security.

Since it is unlikely that attacks on energy facilities can be totally prevented, it may thus be more effective to implement policy tools aim at minimizing the extent of damage to supply once an attack occurs, rather than focus solely on ensuring an attack's interception. First, an emergency plan can be implemented15 for coping with energy crisis situations, which will handle both the renewal of supply and the moderation and balancing of consumer demand in all sectors of the economy, in accordance with national interests. Furthermore, it is possible to provide natural gas consumers, and particularly electricity producers, with the ability to make use of a variety of energy resources16 ('alternative fuels'), such as gas, coal and fuel oil and thereby to ensure the continuity of their operations. It is also possible to prepare additional energy supply sources17 – suppliers from different geographic regions, both from Israel and abroad – by developing the necessary infrastructures for this purpose. Such infrastructure may include, inter alia, liquefied gas receiving buoys (STL), pipelines to transmit oil and gas from neighboring countries, fossil fuel receiving platforms, etc. An additional effective tool for dealing with an energy

12 A situation characterized by a high level of integration between a variety of military, police and civilian entities.

13 Observe-Orient-Decide/Delay-Act

14 Shaffer, 2009

15 Emergency plans for coping with energy crisis situations are implemented within many countries around the world, sometimes independently and sometimes through umbrella organizations such as the International Energy Agency. Israel may benefit from implementation of such an emergency plan. An example of key principles for an emergency plan may be found at – (IEA, 2013).

16 Or: 'Resourse Diversity'.

17 Or: 'Supplier Diversity'.

crisis – particularly in the initial stages, until the alternative system is stabilized and begins operation – is the maintenance of appropriate emergency stock levels of fuel and gas storage. Finally, is essential to define principles within the energy policy that will ensure the establishment of infrastructures with interchangeability, flexability and redundancy.

Theoretical framework for analyzing methods of protecting critical infrastructure installations

Below is a proposal for a model that strives to connect between the analytical research methodologies of military threat evaluation[18] (including physical security risk assessment of facilities) and the theoretical tools of political science uses to ensure energy security. To this end, the first phase consists of an infrastructure review and critical assets characterization, followed by identification of events that can cause infrastructure functioning failure. Then, possible threats to the infrastructure are examined, while assessing the likelihood of their occurrence and the level of risk that they constitute to the facility. According to the results, the degree of damage to energy supply capabilities is calculated, while taking into account the measure of impact on the infrastructure. The degree of damage is defined in terms of quantity of time. The last phase examines policies that can minimize the extent of impact caused by reduced supplies, while making 'cost-benefit' considerations. Figure 18.2 below presents this analysis model. Further details on this topic can be found in the research of Zarchi, 2014.

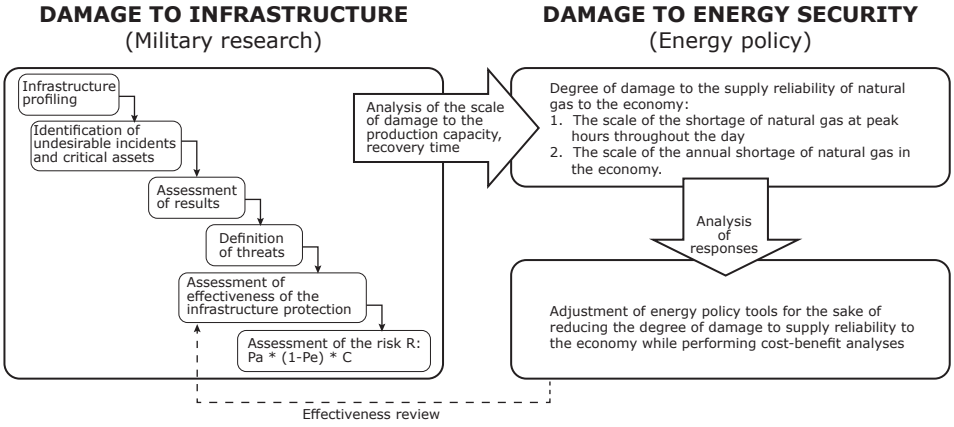

Figure 18.2 Theoretical framework for analyzing methods of protection of critical infrastructure installations

18 A centeral methodology used by this model is a methodology developed by the Sandia Institute (Sandia, 2000)

The case of Israel – initial situation assessment

The energy economy and the maritime infrastructure

In recent years, supply and demand for natural gas have been on a steady upward trend. In 2015 alone total natural gas consumption rose by 11% compared with 2014. This trend continued in 2016,[19] and forecasts predict that by 2024 demand will have increased by 75% compared to the present level.[20]

Accordingly, the State of Israel is developing its maritime energy infrastructure. Currently, gas supply to the Israeli economy is based on the Tamar reservoir, with assistance by the Buoy[21] as a routine supplementary supply source and as a partial backup array[22] in times of crisis. For example, last year's gas supply mix consisted of production of approximately 8.3BCM from the Tamar reservoir and the balance, approximately 0.13BCM, was supplied through the buoy.

The gas in the Tamar reservoir is produced by five wells[23] and makes its way through two pipelines, each about 140 km in length, to the Tamar Rig,[24] which is located approximately 25 km west of the coast of Ashkelon (adjacent to the Gaza Strip fishing zones). When the main treatment is complete, the natural gas is transmitted through a pipeline to the onshore receiving terminal in Ashdod. Figure 18.3 illustrates the structure of the current gas infrastructure.

In fact, under the current situation, Israel's maritime energy economy is based on a single primary reservoir – the Tamar Reservoir – and on infrastructure characterized by a low level of robustness.

19 In the present year there has been an increase of approximately 14.5% in gas consumption by the electricity generation sector. In the industrial sector, by contrast, a scope of consumption similar to the scope in 2014 was maintained.

20 The Ministry of National Infrastructures, 2015

21 This refers to a marine buoy that enables reception of natural gas from an LNG regasification vessel, at a rate of 0.57 million cm of gas per hour (The Ministry of Energy and Water Resources, 2013).

22 The gas supply rate of these two sources together comes to approximately $2_{MCM/h}$, where approximately 75% is supplied from the Tamar Reservoir, while only approximately 0.25% is supplied by the buoy.

23 The wells were built in a manner that would enable production of from 7.1–8.5 million cubic meters of gas per day each.

24 The rig constitutes the initial and primary treatment installation. It is located at a water depth of 237 meters and rises to a height of approximately 60 meters above sea level.

Figure 18.3 Tamar Reservoir infrastructure

Vulnerability of the maritime infrastructure and its significance

In order to examine the degree of vulnerability of the infrastructure in various scenarios, we must first define three levels of vulnerability, referring to the degree of damage to production capacity and to its duration:

- Low level – partial damage to production capacity and a short time frame required for repair (up to a few months).
- Moderate level – significant damage to production capacity and short time frame for repair; or partial damage to production capacity and long time frame for repair (several months or more).
- High level – significant damage to production capacity and long time frame for repair.

Based on these definitions, the components of Israel's maritime infrastructure can be classified according to their level of vulnerability:

- The production wells – low level of vulnerability: decentralized and modular infrastructure with high redundancy (5 wells). The time required for any repairs is relatively short.
- Underwater pipeline – low to moderate level of vulnerability: modular infrastructure with partial decentralization and limited redundancy (2 pipelines). The time required for any repairs is relatively short.
- Tamar Rig – high level of vulnerability. Infrastructure characterized by a lack of redundancy, interchangeability and resilience. The time required for any repairs is long.[25]

Accordingly, it is possible to define the **Tamar Rig as the critical component of the maritime energy infrastructure of the State of Israel**. A preliminary analysis

25 It can be estimated at about a year and a half.

of supply versus demand reveals that significant damage to the Tamar Rig would lead to a shortage of roughly 50% of the total fuel mix required for generating electricity.

Key threats and protection methods

In the case of Israel, intentional damage to the gas infrastructures could be caused by an attack carried out by states or by non-state entities. Several non-state entities have even recently declared their intention to carry out physical attacks against Israeli infrastructures in general[26] (such as the threat to damage the ammonia tank in Haifa Bay) and against maritime energy installations in particular.[27] For example, the Secretary General of Hezbollah, Hasan Nasrullah, has expressed explicit threats to damage Israel's gas rigs. [28]Along with this, we can see ongoing efforts by Hamas to acquire maritime and subsea capabilities.[29]

As a rule, the threats can be classified into a number of key groups: (a) attacks by booby-trapped vessels; (b) firing of coast to sea missiles - with the emphasis on 'Yakhont' (P-800 Oniks) and C802 class missiles; (c) damage by means of subsea capabilities;[30] (d) Cyber damage – particularly by powerful entities in this field.[31]

Israel operates a multi-layer defense array against the range of threats as a whole. The external layer is based on existing state defense and intelligence capabilities, which are operated by the military and the various security officials in routine and emergency times alike. This defense layer includes, inter alia, the air defense array (anti-aircraft, RPVs and missiles), an array of routine land and marine security patrols[32], visual (detection and identification) and control activity in the field, various kinds of intelligence activity, plus surveillance and enforcement of civilian

26 An interview with Hezbollah leader Hasan Nasrullah on the Walla website http://news.walla.co.il/item/2945637

27 An interview with Rear Admiral Dror Friedman, head of the navy's sea division in the Globes newspaper 19/01/2015.

28 State Comptroller. The protection of installations and infrastructures for gas and oil production at sea, Annual Report 64 in 2014.

29 An example of this can be seen in the terrorist infiltration by sea of Zikim Beach in the course of Operation 'Protective Edge' (5/7/2014).

30 These capabilities become more and more available within the framework of the commercial market.

31 To date, a real capacity of causing physical damage – which combines accurate intelligence and high technological capability – is mainly prevalent among state entities. However, this field is gaining momentum among additional entities. Moreover, it is quite possible that in certain cases a sub-state actor will be assisted by a state entity (by proxy).

32 Hereinafter: Routine security measures.

entities (such as commercial ships). Along with these, new subsea and cyber defense capabilities have recently been developed. An additional defense layer is a designated maritime defense system which is currently being established by IDF through the Israel Navy, with the aim of protecting Israel's critical interests in the energy sphere within the exclusive economic zone (in accordance with Cabinet Decision 53/b[33]). In order to accomplish this mission, the Navy has acquired four corvettes. The first corvette is due to arrive in Israel in the course of 2020. This is being accompanied by a review of measures and technologies in the air defense and subsea spheres which can be operated using these boats.[34] Finally, there is an internal defense layer – in the immediate vicinity of the installation – which consists of a local security team that operates on behalf (and under the responsibility) of the gas production company.[35]

Despite the defense array that is currently taking shape, it seems that in the present security reality there are several significant threats to Israel's maritime energy infrastructure, with the major ones being attacks perpetrated by a sub-state entity. A study that examined the degree of vulnerability of Israel's maritime gas infrastructure to acts of terror, with reference to potential threats and defense capabilities, found that there are several possible scenarios for significant and long term damage to gas production capacity. The major threats that were identified related to the use of explosive boats, booby trapped planes and predator merchant ships (Zarchi, 2014).

Accordingly, along with the physical defense array it is advisable to also develop energy policy tools aimed at reducing the extent of damage to the supply capability in the event of damage to the maritime installations.

Summary and recommendations

Over the course of recent years, the extent of supply and demand for natural gas in the State of Israel has been on a steady upward trend. In 2015 alone the total

33 On 13.11.13 the Security Cabinet decision was made (no. 53/b) with regard to 'protection of the critical interests of the State of Israel in the energy sector in the Mediterranean Sea ('economic waters'). Which regulates the protection and the security of the maritime gas installations (hereinafter – decision 53/b). This decision imposed on IDF 'to take action to protect the critical interests of the State of Israeli in the energy sector in the exclusive economic zone [economic waters]".

34 The cost of establishing the array for protecting the economic waters is estimated at three billion dollars (Bamahane, 2012), (Katz, 2012).

35 From the State Comptroller Report 64b pg. 21: "Private security companies perform the local security for the gas production installations at sea, routinely and in emergencies".

natural gas consumption rose by 11% compared with 2014 and the forecast is that demand will only continue to increase.

Accordingly, the State of Israel is developing its maritime energy infrastructure. Currently, the gas supply to the Israeli economy is based on the Tamar reservoir, with the Tamar Rig constituting the critical component of its maritime energy infrastructure. Significant damage to the Tamar Rig would lead to a shortage of roughly 50% of the total fuel mix required to generate electricity in the coming years.

It seems that in the present security reality there are several significant threats that may cause such damage, with the major ones being acts of terror by sub-state entities. In particular, we can point to a number of major possible scenarios for significant and long term damage to gas production capacity: use of explosive boats, use of booby trapped planes, or use of 'predator' merchant ships.

Since it is probably impossible to completely prevent attacks on energy installations, and particularly maritime energy installations, it may thus be more effective to implement policy tools aim at minimizing the extent of damage to supply once an attack occurs, rather than focus solely on ensuring an attack's interception. These tools may include an emergency plan for coping with crisis situations, the ability to use a variety of alternative energy resources, preparation of additional energy supply sources and development of the necessary infrastructure to this end, maintaining appropriate emergency stock levels of fuels, and finally, defining principles to ensure the establishment of an infrastructure with interchangeability, flexability and redundancy.

Conclusions and Policy Recommendations

Shaul Chorev

The Eastern Mediterranean and the surrounding countries continued to be a region of instability in 2016. The security situation in the region remained problematic due to the civil war, the lack of governance and the lack of functioning in several countries, to the point of becoming failed states. Contributing to this situation is the political function that Islam has taken on itself, as well as the unequal distribution of income, the lack of democratic mechanisms, the population flows in the areas of conflict and other factors. As a result of the prolonged fighting, there is increased presence of weaponry that is used in the regional conflicts. With regard to the superpowers, the decline in US involvement in the region continues, which is weakening its position. In addition, the deep structural crisis in the EU is affecting its global status, including in the Eastern Mediterranean. Vladimir Putin, the President of Russia, is correctly reading the geopolitical map in the Middle East and his opportunistic policies are deepening Russia's involvement in the region and filling the vacuum left by the US.

Some of the strategic changes occurring in the region involve risks for Israel, while other are creating opportunities that were not previously open to it. The developing relations with Egypt and Saudi Arabia constitute one of those opportunities, even if they both condition the improvement of relations on finding a solution to the Palestinian problem.[1] Nonetheless, it is worth emphasizing that Israel's military position is favorable and there does not appear to be any significant military threat that in the near future can endanger its existence, including ones that originate from the maritime domain.

The nuclear agreement signed between the West and Iran in July 2015, stopped/delayed Iran's progress towards achieving nuclear weapons and is creating a certain amount of opportunity in the region. It should be remembered that at the end of the day, Iran remains a country on the brink of nuclear capability (known as nuclear hedging) and that it is continuing to test ballistic missiles that can be used in the future as a means of delivering nuclear warheads. This requires that the international community continue to monitor the situation, in addition to

1 A speech by Egyptian President Abbed Fattah el-Sisi at Asyut: 'If we could solve the matter of our Palestinian brothers, peace would be warmer...I have asked the Israeli leaders to allow the broadcast of this speech once or twice since it is a real opportunity." Walla News, May 17, 2016, http://news.walla.co.il/item/2962078.

the oversight by observers of the International Atomic Energy Agency over Iran's facilities.

ISIS has during the year managed to occupy territory in eastern Syria and in Iraq, although towards the end of the year, as a result of attacks by Russia, Turkey and the US, it lost its hold over some of these areas. Nonetheless the organization continues to occupy a number of strongholds. ISIS has successfully carried out a number of terrorist attacks in Europe and the US which have undermined the feeling of security among their populations. The refugee crisis is worsening the situation in the region and is complicating immigration policy in Europe. One of the most urgent issues that Donald Trump, the new American president, will have to deal with is the situation in the Middle East. Nonetheless, in view of the fact that the US election campaign focused primarily on domestic issues, it is as yet unclear what the Trump Administration's position will be.

In the maritime domain, this report again stresses the fact that Israel can be viewed as an island, since it is overwhelmingly dependent on maritime trade. On the other hand, there was no significant change in maritime trade with its Arab neighbors in 2016. Nonetheless, Israel has replaced Syria in recent years as the overland bridge between Europe on the one hand and Jordan and Iraq on the other. Cargo arriving at the port of Haifa from Europe is transported from there to the Nahar Hayarden crossing in trucks, including European trucks. In 2015, there was an increase of 25 percent in the number of trucks (to more than 13,000) and this number is expected to grow as a result of the entry of international transport companies, which will add about 150 trucks per month to the traffic between Europe and Jordan by way of Israel, and the inauguration of the Haifa-Beit Shean railway line.[2]

The dependency of Israel on the sea has increased in recent years, as a result of the discovery of offshore natural gas, the development of desalinization plants that provide most of Israel's drinking water, the expansion of maritime trade with the Far East and the recognition of the importance of the sea as part of Israel's strategic depth. In addition to the contribution of the sea as a component in Israel's security and the welfare of its citizens, there is an increasing need to protect the ecological system of the Mediterranean in order to ensure that these activities do not damage the nature and heritage of the sea and its coasts.

2 Yisrael Katz, the Minister of Transportation: "We will transform Israel into a land bridge between the Mediterranean on the one hand and Jordan and other Middle Eastern countries on the other – a process that is already happening." Jerusalem Post Conference in New York, May 23, 2016.

Based on the evaluation that was carried out, attached are ten recommendations, all of which are on the level of government policy in the maritime domain. The order of the recommendations is not necessarily an indication of their importance or their level of urgency. Many of them are based on the joint report of Haifa University and the Hudson Institute that was published in September 2016.

First recommendation – Formulation of a maritime strategy for Israel

A formal process should be initiated that will begin with the identification of Israel's interests in this domain and the formulation of policy on all aspects of the maritime domain. Following that, it will be possible to formulate a maritime strategy that will include defined targets and the ways to achieve them.

At the same time, the awareness of the maritime domain should be increased among the citizens of Israel. This should be done by means of a Maritime Domain Awareness Plan that will provide a better understanding of the issues that relate to the maritime domain and which can affect security, safety, economics and the environment.[3] In this context, the definition of the maritime domain includes all of the ocean territory and the surrounding regions, including the activities of people, infrastructure, cargo and the means of transporting them.

The creation of such a plan must take into account the unique situation of Israel in the Mediterranean and its special interests in the region. Many of the components of a Maritime Domain Awareness Plan have been described already in the work of the Technion group.

The second recommendation – Protecting essential shipping to and from Israel

The factors should be identified that are essential to protecting the sea lines of communication, both in times of peace and in times of war, in the Eastern Mediterranean and in the southern Red Sea, in view of the maritime terrorist threats in these regions.

3 International Maritime Organization (IMO), AMENDMENTS TO THE INTERNATIONAL AERONAUTICAL AND MARITIME SEARCH AND RESCUE (IAMSAR) MANUAL, P. 4, Ref. T2–OSS/1.4, 4 ALBERT EMBANKMENT LONDON SE1 7SR, 24 May, 2010.

The need for designated ships to be used for transport in times of emergency (the "golden share holding within ZIM") should be assessed, as well as the method for putting them into operation if the need arises.

A policy should be formulated for operating the ports in times of emergency, under the threat of rockets and precise missiles, and consideration should be given to the capabilities necessary to accomplish this.

An analysis should be carried out in the cyber domain and a plan for the protection of the Israeli commercial fleet, the ports and their infrastructures against cyber attack should be formulated.

Third Recommendation – Integration of the Mediterranean as part of Israel's strategic depth

The strategy according to which the Eastern Mediterranean provides Israeli with additional strategic depth should be developed further. An evaluation should made of the capabilities and infrastructures that are needed in order to solidify this strategy.

A feasibility study is needed for the creation of artificial islands, pursuant to Government Decision 4776 from June 17, 2012, and a long-term plan is needed for the transfer of hazardous infrastructures (facilities and testing grounds) to artificial islands that will be built within Israel's coastal waters. In this context, it is possible to implement the plan of the Water Authority, which has recommended the establishment of desalinization plants out at sea. This will make is possible to desalinize without taking up valuable land along the coast.[4]

Fourth recommendation – Development and utilization of offshore energy resources and protection of the environment

An analysis is needed of the strategic implications of the offshore resources recently discovered (natural gas and later on also oil) and also the resources that exist with a high probability and which will be discovered in the future within Israel’s economic waters.

It should be decided how to optimally develop the energy from offshore natural gas, including how to use the profits.

4 Establishment of Desalinization Plants in the Open Sea, Water – portal of the Water Authority.

The decision should be based on the experience of other countries with regard to best practices in order to achieve the targets that have been set.

The full array of geopolitical and geostrategic considerations (opportunities and risks) should be looked at in the context of countries to which Israel is interested in exporting gas, with the goal of strengthening its diplomatic and economic status.

Policy should be decided on that will incentivize foreign investors to invest in the development of the gas fields and will reduce the economic risk that Israel is exposed to. It should be ensured that the principles of this policy will be transparent to the public.

The regulatory system should be directed toward the protection of the ecological environment, including protection of the heritage sites and archaeological sites.

Fifth recommendation – Development of professional human infrastructure in order to deal with Israel's new maritime challenges

It should be decided what public resources are required for investment in the social systems in Israel (education and higher education) in order to build an economic, social and human/professional infrastructure that can deal with the challenges and opportunities in the maritime domain. This includes energy production and development, protection of the ecological system, etc. and the infrastructure needed to deal with these issues. It also involves the creation of a maritime forum for Israel that will serve as a platform for discourse among parties with an interest in the maritime domain.

Sixth recommendation – Formulation of Israel's foreign policy in the Eastern Mediterranean and the Red Sea

Israel's interests in the Eastern Mediterranean should be identified and the best policy for protecting those interests —and those of its closest ally, the US— should be adopted. To this end, common allies should be identified and the opportunities and risks of the growing Russian presence in the Eastern Mediterranean should be examined.

The domains in which it will be possible to continue collaborating with Russia should be identified, as well as cases, if there are any, in which the US also has joint interests.

It is worthwhile, following the reconciliation agreement with Turkey, to examine the long-term geopolitical interests of Israel and Turkey, including in the export of gas.

The interests of China that motivate their activity in the Mediterranean and the Red Sea, as defined in China's strategic document "The Maritime Silk Route", should be assessed, in view of its increased maritime presence in the region. We must ask ourselves how Israel should respond to this presence, including the Chinese investments in the building of essential infrastructure in the ports of Haifa and Ashdod and China's involvement in the operation of these infrastructures.

Seventh recommendation – Dealing with terror organizations in the maritime domain

The security threats from non-state organizations in the maritime domain should be identified, as well as the capabilities these organizations are likely to target.

We should examine the likely implications of the actions of such organizations that originate from the coastal waters of Syria, Lebanon or Libya or from the coastal waters of the southern Red Sea.

We should understand the implications of the possible connection between international terror and the proliferation of weapons of mass destruction and advanced weaponry.

The implications of the growing involvement of Iran in Syria in the maritime domain should be evaluated.

The effect of recent events in Lebanon should be assessed, as well as the implications of the presence of advanced Iranian naval weaponry in Lebanon.

The relations with Egypt and the implications of the arming of the Egyptian navy with cruise missiles and advanced weaponry (and in particular a fleet of submarines) should be evaluated.

Eighth recommendation – The promotion and enhancement of maritime law

The conditions under which Israel is prepared to sign the United Nations Convention on the Law of the Sea should be examined.

Professional manpower that is capable of representing Israel in maritime international organizations should be nurtured.

Training programs should be developed on matters of international law in all aspects of the Eastern Mediterranean, including the freedom of navigation, littoral rights, exclusive economic zones and the Law of the Sea.

The most appropriate model should be adopted for the resolution of the maritime boundary dispute between Israel and its northern and southern neighbors (whether or not by means of the Law of the Sea).

A mechanism that is designed for maritime activity opposite the Russian navy should be developed.

A mechanism for deconfliction should be established.

Existing practices and methods in the West with regard to the development of offshore energy infrastructure should be adopted. These should allow a democratic country to find the correct balance in the exploitation of its energy resources, the correct use of the profits in order to strengthen its economy and education system (emphasis on development that is related to the maritime domain of energy production and development) and protection of the ecological system.

A program should be created that will train military personnel and government officials who are involved in maritime strategy and international maritime law, which will be based on teaching methods such as simulations and models, including the use of roundtable exercises.

Ninth recommendation – Exploitation of the opportunities created with the discovery of offshore natural gas in order to strengthen Israel's international and economic status

Geopolitical opportunities provided by the discovery of natural gas should be identified in order to develop regional cooperation with neighboring countries (Turkey, Egypt and Jordan) and with gateway countries to Europe (Cyprus and Greece).

The possibility should be investigated of using the natural gas resources in the coastal waters of Gaza in order to promote relations with the Palestinians, including the development of a civilian port in Gaza.

Israel should assess its economic, security, environmental and political considerations in relation to the pipeline infrastructure, the floating supply facilities and the LNG terminals.

It would be worthwhile to formulate an environmental policy in order to protect the ecological system. This should be accomplished by means of a plan that will identify the environmental elements that are to be taken into account in the context of offshore natural gas, including readiness for disasters, the measures that should be adopted in order to prevent/deal with such events and the bodies that should be active in this sphere.

Tenth recommendation – Inclusion of the Research Center for Maritime Policy and Strategy within national research

The activity in strategic and diplomatic aspects of the maritime domain requires special multidisciplinary knowledge that is currently not to be found in Israel.

The Haifa Research Center for Maritime Policy and Strategy is, among other things, a center for multidisciplinary and independent knowledge in the area of maritime strategy, in the broadest meaning of the term, with emphasis on Israel and its maritime environment in the Eastern Mediterranean and the Red Sea.

Over the years, the Center has developed extensive relations which can contribute significantly to the strategic international maritime discourse that Israel is a part of.

This situation creates the opportunity for the State of Israel to exploit the professional and scientific knowledge that exists at the Center and to invest the necessary resources in order to enable researchers in this field to optimally carry out future applied research in relevant fields and in this way to continue contributing and strengthening Israel's maritime status.

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Haifa Research Center for Maritime Policy & Strategy

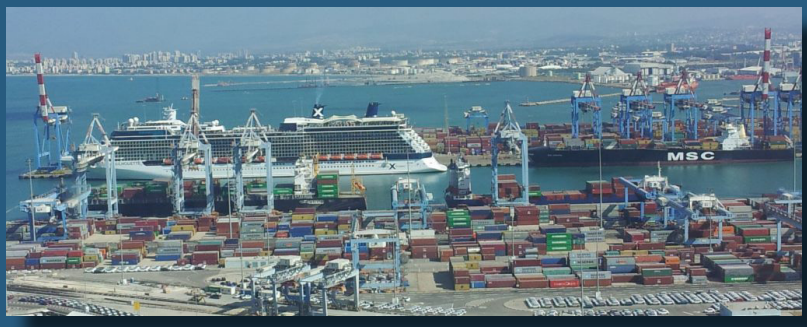
MARITIME STRATEGIC EVALUATION FOR ISRAEL 2016

Chief editor: **Prof. Shaul Chorev**
Edited and produced by: **Ehud Gonen**

The Haifa Research Center for Maritime Policy and Strategy deals with issues of maritime strategy as part of the effort by University of Haifa to take a leading role in maritime research in Israel. The Center carries out academic research related to regional security and foreign policy, the flow of goods, people and ideas, law, energy and the environment, while taking into account their effect on Israel's national security.

The Maritime Strategy Evaluation for Israel 2016 includes policy recommendations which the authors believe can help Israel deal with the challenges described in the report. These include: Israel's unique geographic location, the high proportion of its population that resides near the Mediterranean coast, the discovery of offshore natural gas reservoirs, Israel's total dependence on sea transport (exports and imports), the sea as the only possible location for new infrastructures and as the destination for hazardous infrastructures to be removed from populated areas, the ecological implications of maritime development and the preservation of the maritime heritage.

The authors of the report include researchers of the Haifa Research Center for Maritime Policy and Strategy of University of Haifa, research fellows of the Center and other academics at the University with specialized knowledge in these areas.



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