MARITIME SECURITY CONFERENCE - 2020

'Maritime Security in Pandemic Environment'

16 - 17 September 2020

CONFERENCE PROCEEDINGS

NATO Maritime Security Centre of Exellence
(NATO MARSEC COE)


MARITIME SECURITY CENTRE OF EXCELLENCE
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Editorial

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FOREWORD

Maritime security has been an important component of international relations throughout history, especially in the global economy. Maritime domain which is vital for global trade, also carry some threats such as terrorism, proliferation of weapons of mass destruction; cross-border organized crime and irregular migration. With the developing technology, cyber threats have been added to these threats as well. Nowadays, COVID-19 which has been believed to create a new world order, has had serious effects on the maritime domain.

In order to draw attention to this crucial issue in terms of maritime security, we planned to conduct Maritime Security Conference-2020 with the theme of "Maritime Security in Pandemic Environment" as our first diamond event in June 2020 right after the completion of NATO accreditation of our centre. However, it has to be postponed to September 16 and 17, due to this pandemic which has still been affecting the world on a large scale, including maritime domain.

The aim of the conference was to provide a global and regional focus for maritime security and to discuss maritime security related issues including the challenges and I think the conference was quite fruitful and gave the opportunity to bring forward maritime security challenges, potential impacts of the COVID-19 on maritime security together with some solutions to deal with these challenges as much as possible.

As I always emphasize that closer inter-agency cooperation with the universities and international organizations along with other stake holders of maritime security is indispensable to create a safer and more secure maritime environment.

As a requirement of our concept and in order to support efforts in the field of maritime security at the highest level, this conference will be conducted annually with new challenging themes. I hope I may host you in İstanbul for the next conference in person rather than virtual.

Lastly, I would like to express my sincere gratitude to the moderators, speakers and presenters who contributed to our conference with their valuable presentations, to the conference core staff who worked with great devotion for running this organization smoothly and to those who actively participated in the conference with their questions and comments, last but not least to the conference academic committee who reviewed all the articles for the sake of conference.

Sümer KAYSER
Capt. (TUR-N)
NATO MARSEC COE Director

FOREWORD

The Maritime Security Conference-2020 was an excellent platform to look at issues related to maritime security in a unique setting. Only a few months before the conference, a pandemic had started to spread, leading to many new and unexpected challenges. Navies and other maritime agencies also felt the impacts of these challenges. It was therefore important to identify lessons learned and to start discussions about maritime security in a pandemic environment as soon as possible.

Unfortunately, the term 'maritime security' is not used in a systematic way, neither by academics nor by practitioners. In short, it means different things to different people. Even naval officers may have very different perspectives. Few navies are really capable of projecting power at sea, many others are essentially limited to law enforcement operations in their own country's Exclusive Economic Zone.

In addition, there are many stakeholders outside of navies who are – broadly speaking – interested in maritime security. A secure environment at sea ensures that fishing grounds as well as maritime trade are protected, allows for offshore oil and gas production and enables coastal tourism to develop. Many other aspects could be named as well, but none of them are an end in itself. Governments should rather see maritime security as an enabler for economic growth and development as well as for the marine environment's protection.

None of this has changed in the age of COVID-19. At the same time, the pandemic had a significant impact on the tactical and operational level, but also on the level of high-ranking military and political decision-makers. The articles in this book, based on presentations during the conference in September 2020, are not a complete summary of all these impacts. However, they underline the impacts of the pandemic in many different areas. Moreover, the authors provide thoughts and ideas which may help to solve issues in other areas.

The staff at MARSEC COE must be commended for bringing such a broad range of experts in different fields together to stimulate further discussions. I am already looking forward to future courses, workshops and conferences hosted by MARSEC COE. The centre has already provided a large number of outstanding contributions to discussions around maritime security since its inception in 2012, and I am certain that many more will follow.

Dr.Dirk SIEBELS
Editör-In-Chief

INTRODUCTION
of
THE KEY NOTE SPEAKER

INTRODUCTION of THE KEY NOTE SPEAKER

Vice Admiral Keith Blount, CB OBE Royal Navy

Commander, Allied Maritime Command

First let me congratulate MARSEC for its accreditation as a NATO Centre of Excellence by the North Atlantic Council. It is a recognition that you have the expertise and experience that will be of tremendous benefit to the Alliance. It is my desire to deepen and strengthen MARCOM's links with MARSEC and with all the COEs.

NATO is at its core a maritime Alliance. The clue is in the name, and that core aspect endures today. The Atlantic, Mediterranean, Black Sea and Baltic unite our nations geographically and strategically. MARSEC's accreditation will help build and strengthen our Alliance, our understanding and our outreach across the region.

I cannot stress enough the importance of this first conference and of its main theme of maritime security in a COVID-19 environment. As we are all acutely aware, the pandemic has had a massive impact on daily life, not only in terms of economic consequences, but simply by the manner in which we are able to carry out the day-to-day operations of our organisations.

This includes things like: the facilitation of our workforce, the restructuring of our procedures and processes to adapt to teleworking, and the safe and calculated approach to bringing everyone back together in a safe new working environment as we are permitted to do so. And if those unexpected organisational challenges were not difficult enough, we would have been required to accomplish them while ensuring our missions continue -- and while continuing to employ safe measures to limit and minimize risks to our personnel. Because even as we know the devastating impact of COVID around the world, we also know that our competitors might be tempted by even the slightest glitch in our posture or smallest window of opportunity to exploit such a gap.

On the maritime front, I am very proud of the resilience our forces have shown during these challenging times. On the surface, it may seem that there is an inherent advantage to being in the maritime domain during a pandemic. We have the ability to closely control where and when we go places, as well as who we interact with and how closely we interact with them. But in reality, those advantages only gets you so far, when you consider things like crew rotations, necessary port visits, and maintenance requirements. For us, and I am sure for many of you, this was a process that we had to learn from and refine as we went along, but there were a few items that I think set us up for success from the onset.

We established our aim early and gave clear direction on how we were going to monitor, assess, and adapt to COVID guidance as it came out. We communicated with our Allies and their leadership to ensure we were staying apprised of the individual country restrictions and its impact on their personnel. We also ensured that we were maintaining an ongoing dialogue with our headquarters and standing naval force crews. You will notice the common theme among those points, and that is communication. Of course, there were several things we discovered and we needed an improvement on, but our ability to communicate with our personnel and with those across the NATO enterprise enabled us to meet the mission.

Our face-to-face engagement with Allies and partner nations became extremely limited, and our SNF forces curtailed much of their port visit activity and local interactions, but what has remained is their commitment to the readiness and protection of the Alliance. We continue to be engaged across the full range of maritime operations and we continue to exercise our capabilities and interoperability throughout our area of responsibility. Our successful accomplishment of DYNAMIC MONGOOSE in the High North, BALTOPS in the Baltic Sea Region, BREEZE and SEA BREEZE in the Black Sea, and Operation Sea Guardian in the Mediterranean have all showcased our commitment to the Alliance and reassured those whom rely of that deterrence we provide.

I mentioned communication being a critical factor in our success earlier. That does not simply apply to just those working within the walls of the NATO enterprise. The public we serve represents everyone from the military and political leaders of our individual nations to the general populations making up those great countries. One of our greatest successes was our ability to demonstrate our resilience in the face of a global pandemic—not only reassuring those back home but deterring those who wish to interfere.

What COVID showed us is how something that started on the other side of the world can have huge consequence for us all. It was a supreme example of why NATO maritime security requires a global approach. It also speaks to NATO closely for the observation of the rise of China, which will soon be the largest economy in the world. It is a global leader in new technologies. And it also has the world's second largest defence budget. China's rise presents opportunities, especially for our economies and our trade. It is therefore important to continue to engage. China is not an adversary to NATO. But we must fully understand what its rise means for us, the global geo-political shifts that will result and for our security.

A changing world will require new and innovative thinking in maritime security. The opening of the Arctic Northern Sea Route will provide challenges in the underwater domain. By definition, the presence of submarines in this area will bring a new range of challenges, particularly if NATO wishes to secure this route for trade through international waters.

But the changes in maritime security are not only about new geographic frontiers such as the Arctic. The nature of the maritime domain itself is changing with advances in technology, as it has done for over a century. As militaries around the world invest in advanced technology, we recognize that an important part of maritime situational awareness is unmanned systems and their integration into the tactical picture. There is also a critical need for us to embrace and accomplish all-domain operations at sea, incorporating space, ISR, cyber defence and AI data fusion into future operations. This will be particularly important for the employment of 5th and 6th generation fighter aircraft in NATO. It is imperative for Allied Navies not only to leverage these growing and innovative resources, but also to mitigate the risk they pose in the hands of an adversary.

Underwater autonomy is a key element in this new all-domain maritime environment. Portugal hosted a highly successful REP (MUS) exercise in October 2019. It was the first time that so many NATO allies had the opportunity to test together the effectiveness of systems, concepts, techniques and procedures related to maritime unmanned systems, ensuring they can work seamlessly together, bringing together dozens of unmanned underwater, surface and air vehicles for maritime operations. MARCOM is in the planning stages of a follow-on NATO-wide effort to bring maritime autonomy more closely into NATO exercises and operations.

Amidst all the challenges we faced this year, we were reminded that in NATO's greatest maritime asset is cohesion. Our awareness of tensions within the Alliance underpins our need to continually preserve that cohesion as it remains our strongest asset against emerging global threats. We know that the strength of the Alliance is its cohesion and that I am grateful for all efforts to maintain that solidarity and cohesion in difficult times. Collective defence is the founding principle of NATO. Our commitment to Alliance cohesion in the maritime domain ensures we remain able to thoroughly and effectively deter, defend, and project stability while supporting the three primary functional areas of our activities: Strategic, security and warfighting. Thank you for inviting me to be here with you, virtually at this event.

BACKGROUND & NARRATIVE

BACKGROUND

The NATO Maritime Security Centre of Excellence (NATO MARSEC COE) is both a centre for academic research and a multinational hub for practical training in the field of maritime security. MARSEC COE strives to achieve the necessary collaboration amongst stakeholders from government, industry, academia and the private sector.

MARSEC COE's mission is to expand the capabilities of NATO and partner nations by providing comprehensive, innovative and timely expertise in the field of maritime security operations. In line with this mission, the centre has organised a large number of courses, seminars, workshops and conferences since its national inauguration in 2012 and continues to conduct activities as a NATO COE as of 8 June 2020.

This year's Maritime Security Conference-2020 was held by the MARSEC COE in close cooperation with the Combined Joint Operations from the Sea Centre of Excellence (CJOS COE) and the Centre of Excellence for Operations in Confined and Shallow Waters (COE CSW). While the original idea was to combine a physical and virtual conference with the physical gathering to be held at HQ MARSEC COE in Istanbul, Turkey, it quickly became clear that it was only feasible to hold a virtual conference. This allowed for a slight expansion of the agenda and the conference was held over one and a half days on 16 and 17 September 2020.

NARRATIVE

Due to the unprecedented situation caused by the spread of COVID-19 around the globe, the overarching goal of the conference was to look at a broad range of issues related to maritime security that may be caused or impacted by the pandemic. With the theme of 'Maritime Security in a Pandemic Environment', the conference explored challenges, ideas and potential solutions through engagement with subject-matter experts from the military and from academia.

The conference aimed to continue providing a global and regional focus for maritime security and to discuss related issues including, but not limited to, capacity building, awareness and future concepts and technologies, as well as collaboration and coordination among various organisations with a particular focus on the impact of COVID-19.

REPORT OF PROCEEDINGS

Objectives

The following were the principal objectives for the Maritime Security Conference-2020:

- *Understand the multitude of challenges related to maritime security that can be identified in different regions as well as the knock-on impacts these challenges may have on tactical, operational and strategic levels;*
- *Provide a multi-faceted perspective on how different maritime security challenges may be influenced by the global pandemic;*
- *Present and discuss potential operational adjustments, advanced technologies and other means to tackle maritime security challenges during and after the COVID-19 outbreak.*

Furthermore, the conference provided a public forum to introduce the increasingly close cooperation and collaboration among different maritime-focused centres of excellence and entities within NATO, highlighting areas where different stakeholders may cooperate and provide further recommendations.

Structure / Methodology

The conference was conducted via a commercial webinar hosting application, using an 'in situ/simu live' format, at the unclassified level. Overall, 136 attendees from 28 countries[1] participated in the virtual event. The audience was drawn by invitation and networking from an international community of maritime security practitioners. This included attendees from government organisations and the military as well as academic stakeholders and shipping industry representatives in a collaborative setting to discuss the topics set out by the organisers.

[1] Albania, Azerbaijan, Bulgaria, Canada, Denmark, Ecuador, Finland, France, Georgia, Germany, Greece, India, Ireland, Italy, Japan, Jordan, Kuwait, Montenegro, the Netherlands, Poland, Portugal, Romania, Spain, Sweden, Turkey, Ukraine, United Kingdom, United States of America.

The theme of the Maritime Security Conference-2020 was 'Maritime Security in a Pandemic Environment'. The conference was structured around three panels with a number of panellist speakers, each providing their perspective on the respective themes based on individual backgrounds and experiences. Each panel's theme and supporting presentations were designed to trigger questions and stimulate relevant discussion. Each panel was asked to examine one of the different sub-themes:

- *Overview of maritime security challenges,*
- *Ongoing/potential impacts of COVID-19 on maritime security challenges,*
- *How can maritime security challenges be tackled during/after the pandemic?*

With these themes, the aim of the conference was to achieve a common understanding of current maritime security challenges and how these may be influenced by the pandemic. Moreover, some presentations highlighted best practices that can be employed by other stakeholders to limit the impact of COVID-19 on their own operations or to counteract potential challenges in the future.

The final output from the conference will be the proceedings, including articles from the conference speakers. The proceedings are to be published in late 2020 and will provide findings, recommendations and conclusions drawn from the presenters' knowledge and feedback received during—and in some cases after—the conference. Prior to the publication of the conference proceedings, this report provides a preliminary overview of the discussions during the conference, including a very brief summary of the key points made by every speaker.

Panel Sessions

Introduction

The conference started with a brief welcome speech by the Director of MARSEC COE, Capt. (N) Sümer KAYSER, and some introductory comments by the Academic Advisor, Dr. Dirk SIEBELS.

Capt. (N) KAYSER welcomed the audience and encouraged all attendees to participate and ensure that the virtual format would generate a lively debate despite the somewhat unusual format. He also highlighted that the topic of the conference should provide added value to all participants as the COVID-19 pandemic remains arguably the most important current topic. In his introduction, Dr. Dirk SIEBELS then added that such a virtual conference even has an advantage for many attendees who may not have been able to travel to Istanbul in person. Both speakers also underlined that the conference as well as the proceedings will provide valuable assistance to address current and future maritime security challenges in a pandemic environment.

The introductions were followed by two keynote speeches from Vice Admiral Keith BLOUNT, Commander of the Allied Maritime Command, and Brigadier General Davide RE, Director of NATO Strategic Direction-South Hub.

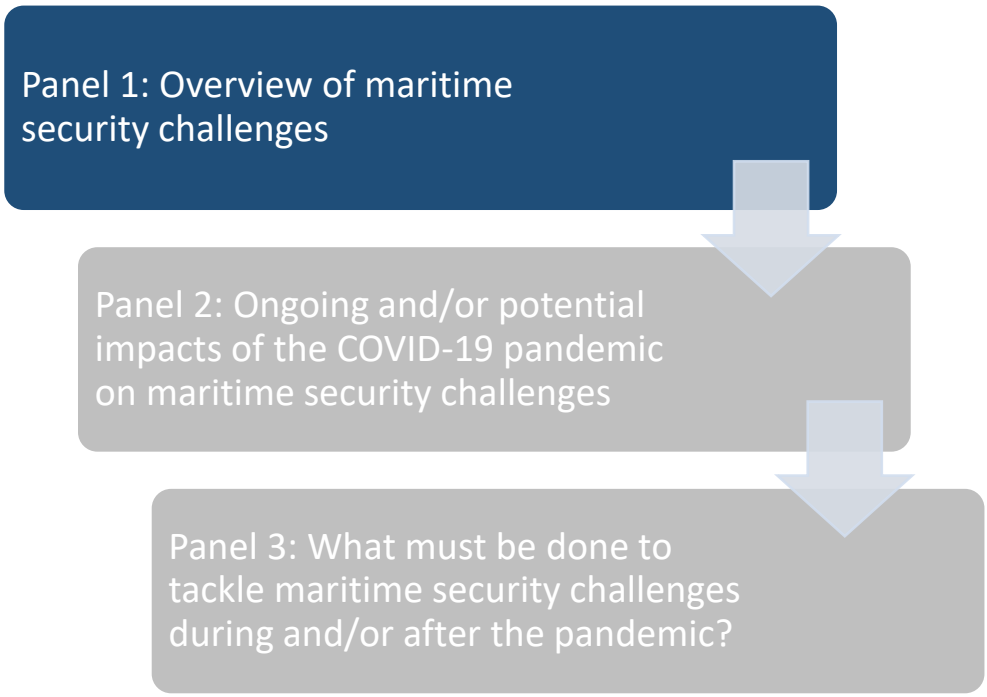
Vice Admiral BLOUNT congratulated MARSEC COE for its recent accreditation as a NATO Centre of Excellence. He pointed out that NATO is essentially a maritime alliance, and the North Atlantic, the Mediterranean, the Baltic Sea and the Black Sea are bringing countries together geographically and strategically; accordingly, the accreditation of MARSEC COE will strengthen the alliance. Operations in the COVID-19 environment add new layers of complexity and difficulty to every activity, while at the same time, COVID-19 is a true test of the alliance's integrity and expertise. NATO has been reassessing its operational path through concepts such as the deterrence and defence of the Euro-Atlantic region and is currently at a turning point.

He also emphasised that it is important to demonstrate that NATO's maritime security requires a global approach. China will soon become the world's largest economy and the global leader in new technologies, and it will have the world's second-largest defence budget. The country's rise will present both great opportunities and difficulties, and the geopolitical changes resulting from this situation should be examined carefully.

Brigadier General RE also congratulated the accreditation of NATO MARSEC COE and stated that the accreditation will be a benefit for NATO. He underlined that the NSD-S Hub's mission is to gather, analyse and encourage information-sharing that contributes to NATO's comprehensive approach, regional understanding, situational awareness and decision-making. It will also try to contribute to the coordination of activities in the Global South. The mission of the NSD-S Hub is to be a comprehensive information-sharing resource, focused on sharing challenges and opportunities analysed with selected partners and actors.

He added that West and Central Africa is a rich yet underdeveloped region. It is home to five out of 32 landlocked developing countries (Mali, Niger, Chad, Burkina Faso and the Central African Republic). Moreover, more than 80% of kidnappings of seafarers around the world are experienced in the Gulf of Guinea, while significant security problems pose a threat to local and regional stability. Regarding piracy and armed robbery at sea, he noted that 72 attacks were recorded in 2018 and 121 attacks in 2019. At the same time, UN Security Council Resolution 2039 encourages international partners to support improvements in maritime security in the Gulf of Guinea.

Panel 1



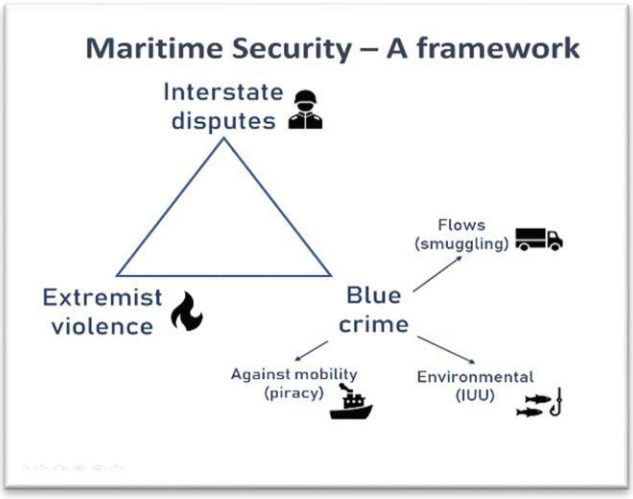
Panel 1 started with questions about the future role of naval forces and a general look at the role of maritime power in a geopolitical context. The following presentations aimed to highlight the broad range of maritime security challenges. They included an overview of naval operations in confined and shallow waters as well as a case study from Bulgaria that underlined the impact of geopolitics on a national maritime strategy. The final presentation then focused on the Northern Sea Route as an area of potential competition in the coming decades.

Panel members:

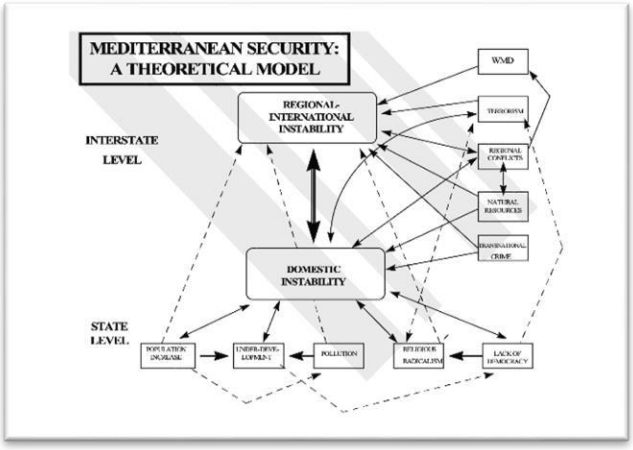
- Dr. Christian BUEGER, Professor for International Relations, University of Copenhagen (Denmark)
- Dr. Emre BAYSOY, Assistant Professor, Department of International Relations, Namık Kemal University (Turkey)
- Cdr. Andreas KUTSCH, Centre of Excellence for Operations in Confined and Shallow Waters (Germany)
- Dr. Siyana LUTZKANOVA, Associate Professor, Nikola Vaptsarov Naval Academy, Varna (Bulgaria)
- Dr. Sait Demir BAKI, Research Assistant, Karadeniz Technical University (Turkey)

Dr. Christian BUEGER provided an overview of the way in which human activity has impacted and altered the planet. That includes the oceans, which are transformed by infrastructures, resource exploitation, waste and climate change, summarised by the term 'Anthropocene'. According to him, these changes may have implications on conditions and tasks for maritime security forces.

Dr. BUEGER indicated that operational conditions for navies and other maritime agencies may become increasingly difficult. At the same time, the spectrum of tasks related to disaster relief, 'blue crimes' and environmental law enforcement could widen considerably. Finally, he underlined that maritime security, the 'blue economy' and conservation efforts could re-enforce each other.

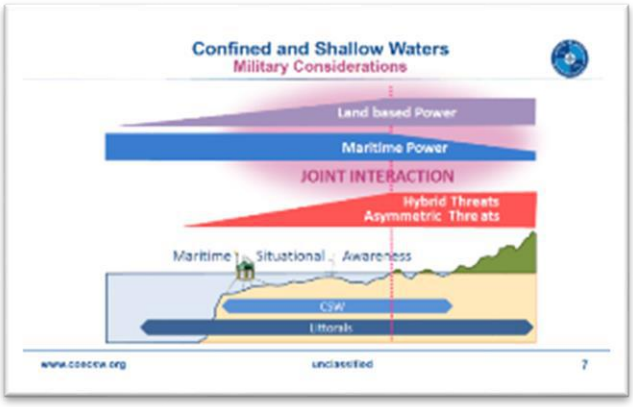


In the next presentation, Dr. Emre BAYSOY pointed out that most national, regional and global risks, dangers and threats are closely related to maritime issues. States must therefore have various maritime capabilities to provide a credible response. The Mediterranean in particular reveals that geopolitical shifts are ongoing, underlining that 'wavy geopolitics' will likely be increasingly important in the coming years.



Dr. BAYSOY explained that 'gateway regions' are sometimes seen as a response to threats like terrorism and radicalisation. In these regions, subnational structures are used at the expense of those on the national level. In the longer term, making use of subnational groups may even lead to a further increase in threats. Interstate cooperation—which would often be maritime-based—is a more sustainable method to counter transnational threats, according to Dr. BAYSOY. At the same time, it should be noted that any cooperation on this level will highlight the close relation between contemporary geopolitics and maritime issues in general.

Cdr. Andreas KUTSCH then addressed the particular challenges of naval forces operations in confined and shallow waters. He started with a general overview that included factors such as geography, oceanography and geophysics, but also key threat aspects and military factors. The presentation then looked at the Baltic Sea region as a perfect example for operations in confined and shallow waters. In this region, such operations have to take into account legal aspects, economic patterns, maritime traffic and infrastructural conditions as well as other aspects, allowing for conclusions on specific military requirements. Cdr. KUTSCH then used mine warfare and mine counter-warfare as examples of operations which may be important outside of crisis situations, as the disposal of historic ordnance requires the use of highly trained experts.



The second part of the presentation looked at developments in the Baltic Sea region over the past years with a specific focus on Russia. Changes in the geostrategic situation have already had some operational impacts. It is therefore important to monitor Russia's perception of the situation in the Baltic Sea as well as Russian military capabilities, which may reshape this particular operational environment in the coming years.

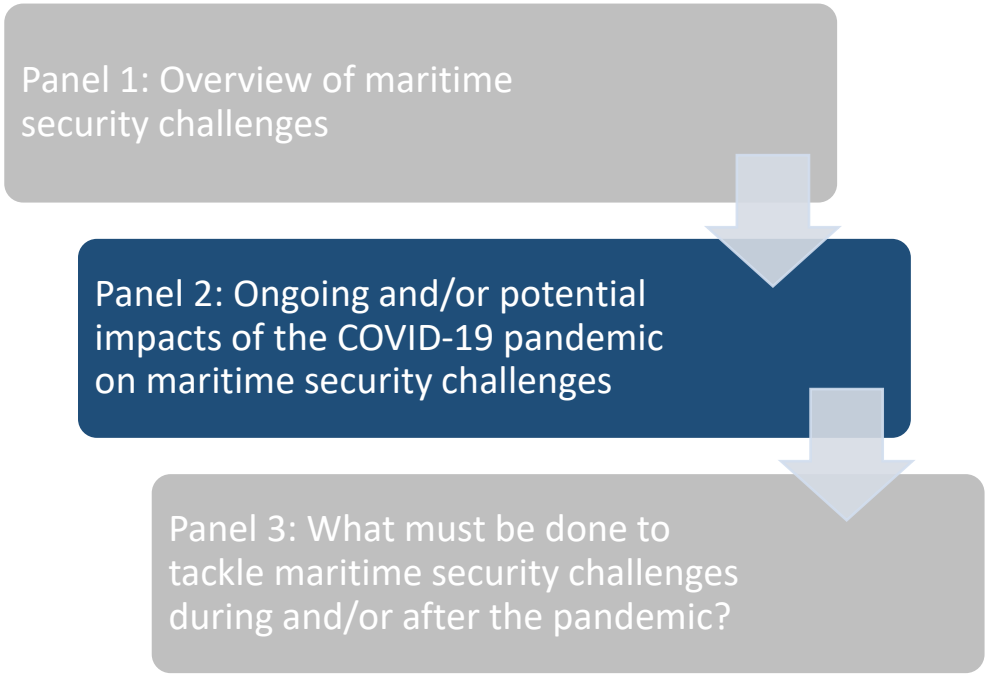
Dr. Siyana LUTZKANOVA examined the impact of geopolitical aspects on a national maritime strategy using Bulgaria as a case study. She stated that three aspects characterise the security environment in the region bordering the Black Sea: energy and transport corridors linking the Caspian and European markets, the potential for hybrid warfare and a vast disparity in military capabilities between coastal countries. Large-scale infrastructure projects will be crucial to strengthen and improve economic ties between countries, but the current environment in Eastern Europe is also influenced by the growing military-political presence of NATO, the United States and Russia.

At the same time, Dr. LUTZKANOVA explained that traditional security policy has shifted from the national to the regional level. Most of today's threats are transnational by nature and often include a maritime dimension. Modern maritime security therefore has to strike a balance between naval forces, different types of naval platforms and other maritime assets, including the merchant navy or critical maritime infrastructure. The combination of these factors has a profound impact on national maritime strategies not only in Bulgaria but also in the wider Black Sea region.

The final presentation in Panel 1 was given by Dr. Sait Demir BAKI, who concentrated on the Northern Sea Route through Arctic waters. Global warming has already allowed for an increase in merchant shipping on this route along the Russian coastline in recent years. If temperature increases continue, the Arctic Ocean may even become an open sea by 2050, although such long-time predictions include a high degree of uncertainty.

Nevertheless, Dr. BAKI underlined that Russia wants to increase transits along the Northern Sea Route and has enlarged its nuclear icebreaker fleet in recent years accordingly. Furthermore, he presented the results of a study that looked at the usability of the route for maritime trade, comparing different types of vessels and voyages on traditional routes to highlight the potential benefits for specific types of operations.

Panel 2

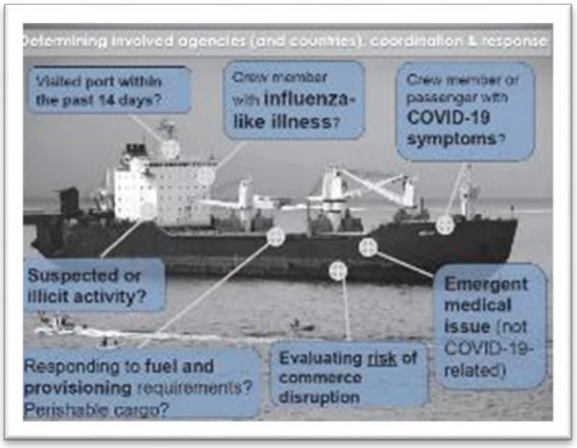


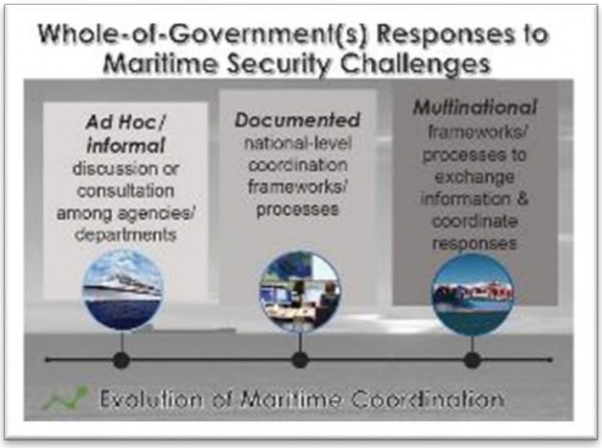
Panel 2 began with a look at maritime security challenges during the COVID-19 pandemic from a global perspective. The following presentations included an overview of grey zone/hybrid warfare activities in the maritime environment, specific operational impacts for navies such as the prevention of WMD proliferation in the maritime environment as well as CBRN defence and—perhaps most importantly—the protection of crews. In addition, specific maritime security-related challenges were highlighted by a comparison between NATO and the African Union, underlining that different regions require different solutions. The final presentation then looked at the future of maritime intelligence, surveillance and reconnaissance (ISR) as well as the potential impact of COVID-19 on related capabilities.

Panel members:

- Mr. Brian WILSON, Deputy Director, US Global Maritime Operational Threat Response Coordination Centre (United States)
- Mr. Brian EGGLESTON, Portfolio Director for International Partnership, National Maritime Intelligence-Integration Office (United States)
- Lt. Col. Bernd ALLERT, Concepts and Doctrines Section Chief, Joint CBRN Centre of Excellence (Czech Republic)
- Ms. Eylem KARAASLAN, CBRN Product Manager, HAVELSAN (Turkey)
- Mr. Aytaç KABAKLARLI, Solution Engineer & CBRN Specialist, HAVELSAN (Turkey)
- Dr. Marten MEIJER, Ret. NATO staff (the Netherlands)
- Capt. (N) Liviu Auras COMAN, Romanian Naval Forces (Romania)
- Capt. (N) Todd BONNAR, Warfare Analysis Branch Head, CJOS COE (United States)

Mr. Brian WILSON looked at a networked approach to maritime challenges. Due to the large number of agencies that have at least some interest in maritime issues, it is important to find a whole-of-government response to challenges of all kinds, including, but not limited to, specific security-related challenges. At an early stage, such a response will often be ad hoc and informal, but the aim should be to develop dedicated coordination frameworks, both on the national and on the multinational level.





Looking specifically at the current situation, Mr. WILSON pointed out that COVID-19 'has challenged everything about maritime security', but at the same time much has remained the same. While some threats—and risks—may have come more to the forefront now, one question remains particularly important: How can navies and other maritime agencies deal with uncertainty?

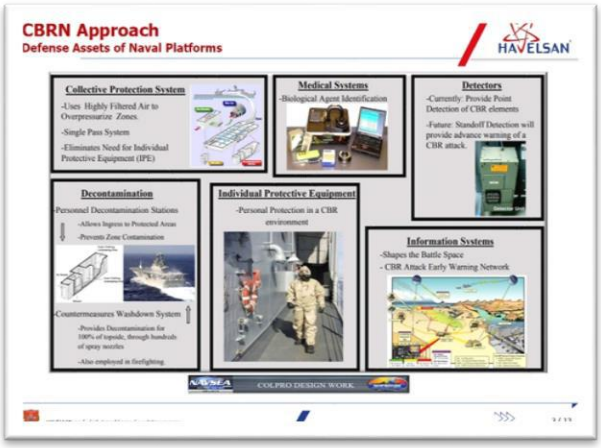
Mr. Brian EGGLESTON then provided an example for an agency that supports maritime domain awareness on behalf of the US government, but also in coordination with allied countries. His agency works with a broad spectrum of partners, ranging from law enforcement agencies to NGOs and the private sector. All partners contribute certain parts, helping to create a comprehensive picture of various types of activities at sea.

The second part of the presentation then looked at hybrid warfare/grey zone activities, ranging from illegal fishing to human trafficking, drug smuggling, piracy and terrorist incidents. According to Mr. EGGLESTON, such activities may represent a threat to free navigation and should therefore be monitored carefully to allow for relevant countermeasures. These may be even more urgent when grey zone activities are supported by or conducted on behalf of governments, replacing a direct naval involvement.

In the next presentation, Lt. Col. Bernd ALLERT examined a specific type of threat in the maritime environment, namely the proliferation of weapons of mass destruction. He underlined that NATO forces must be able to conduct operations to counter this threat even under the current conditions based on relevant force health protection measures.

On a more general level, Lt. Col. ALLERT stated that NATO must be prepared to protect and defend against CBRN threats that may be posed by both state and non-state actors. As recently as 2017, NATO has reaffirmed that the capability to conduct maritime interdiction operations to prevent WMD proliferation remains an important element in the overall preventive approach, even though the actual number of related operations has been very low over the past years.

The following two presentations by Ms. Eylem KARAASLAN and Mr. Aytaç KABAKLARLI were also concerned with CBRN-related issues. They presented solutions that have been developed by HAVELSAN to support decisions through a specialised CBRN Warning and Reporting System. It is particularly noteworthy that this system is not only useful for military purposes, but also for civilian use, for example after a maritime incident involving a spill of chemical products.

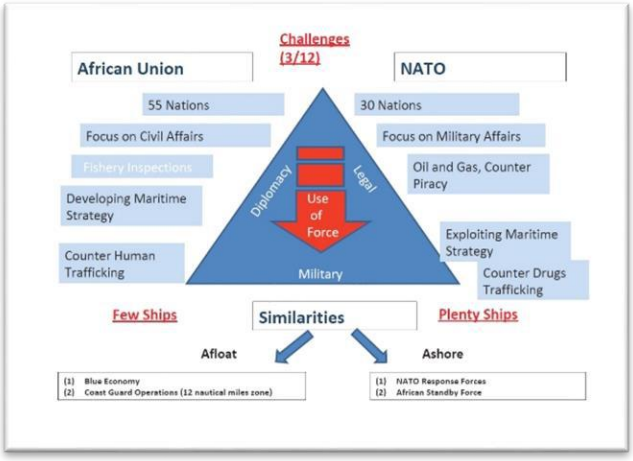


Furthermore, HAVELSAN is currently developing a statistical model to monitor the spread of viruses such as COVID-19. Mathematical models will be combined with real-time data to allow for better predictions of areas where the threat of infection is particularly high. It is planned to integrate this model into the company's existing CBRN systems in the near future, providing better situational awareness in a pandemic environment.

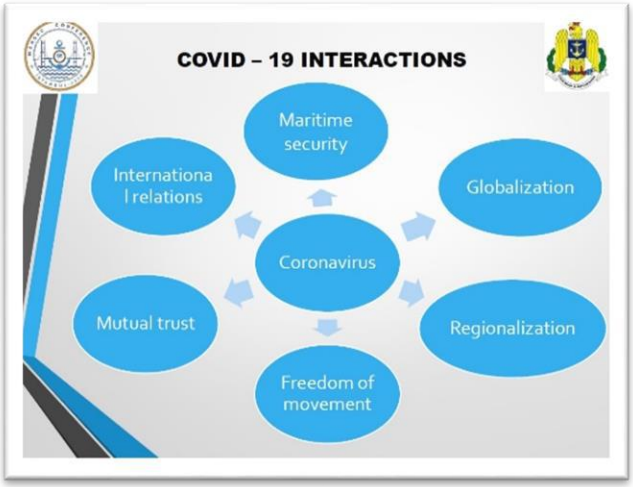
After this detailed look at CBRN-related topics, the next three presentations looked at other aspects that are influenced by the pandemic in different ways. The first presentation was given by Dr. Marten MEIJER, who provided an interesting comparison between maritime strategies introduced by NATO and the African Union.

Both organisations share some common characteristics, being based on collective defence, cooperation and cohesion. On the other hand, NATO is primarily a military alliance with standing naval forces and a broad range of other naval operations, led from various NATO headquarters. In comparison, the African Union is first and foremost a political organisation and does not have similar assets to conduct maritime operations without relying on individual members or regional organisations on the African continent.

Moreover, Dr. MEIJER underlined that both NATO and the African Union are constantly developing their respective maritime strategies. For the African Union in particular, this strategy is currently under development. Among other things, the finalised document is likely to draw attention to a broad range of current and potential threats to African states, leading to revenue losses and helping to fuel violence and create insecurity. The challenge will be to address different threats at the national, regional and continental levels and it will be important to look for solutions that fit these requirements rather than merely copy the strategic approach of organisations such as NATO.



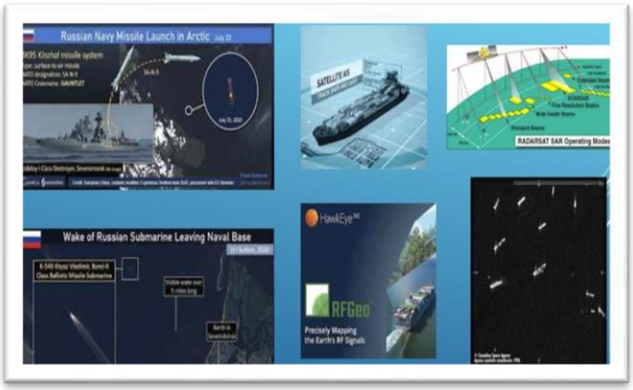
Capt. (N) Liviu Auras COMAN addressed a topic that has been of particular importance since the early days of the COVID-19 pandemic: the protection of crews. He described how this very specific type of threat has had visible effects, which should lead to a reassessment of other risks and vulnerabilities related to maritime security, e.g. required manning and training levels.



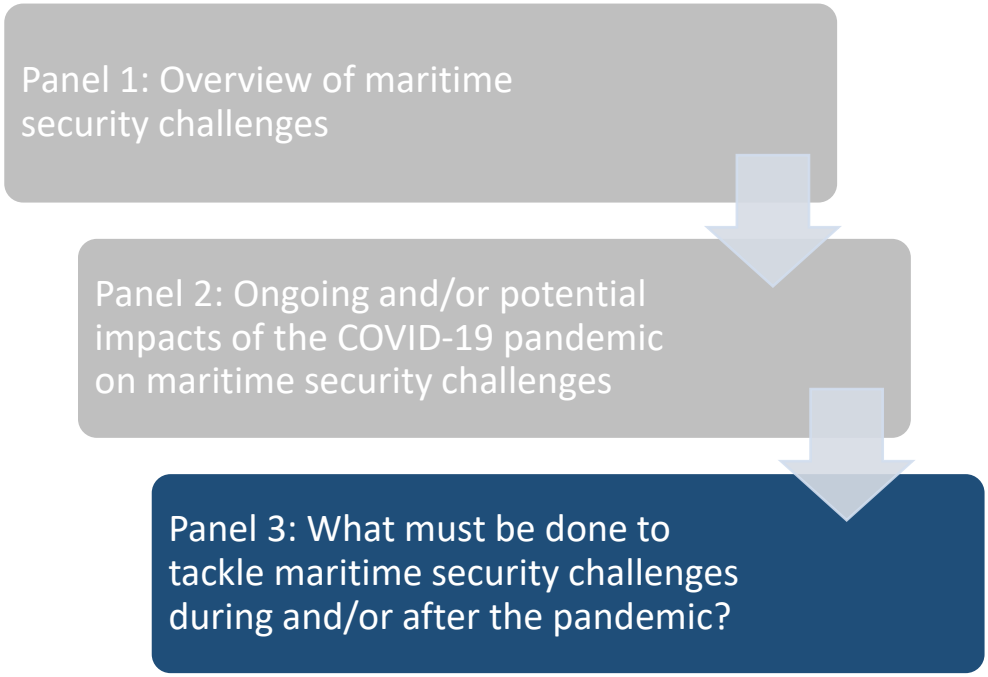
According to Capt. (N) COMAN, maritime security as it has been adopted over the past two decades should be re-evaluated according to new and emerging benchmarks. This would enable all stakeholders to define a new and likely more relevant future agenda of maritime security issues. When it comes to the necessary assets to counter the identified threats, unmanned vehicles are likely to become even more important than today, as aptly summarised by Capt. (N) COMAN: 'The readiness of the navy has a new face'.

In the final presentation of Panel 2, Capt. (N) Todd BONNAR examined the increasing resilience in NATO's intelligence, surveillance and reconnaissance (ISR) capabilities. These are a 'system of systems', combining space-based observation and communications technology with a range of other means to gather and analyse information and data. Modern navies have to use and constantly adapt such technology as they operate in a knowledge-based environment.

To succeed in the race to master this environment, Capt. (N) BONNAR underlined that NATO must constantly optimise maritime ISR across the alliance. Additional tools—including commercial applications—are also required to increase resiliency. At the same time, NATO members have to invest in cyber security and key technology to enable future ISR technologies. However, such investments are likely to become more complicated in the post-COVID economy as governments have to cope with budget restrictions and balance military acquisitions with priorities in other areas. Cost-effective options and acquisition models will therefore become even more important in the coming years.



Panel 3



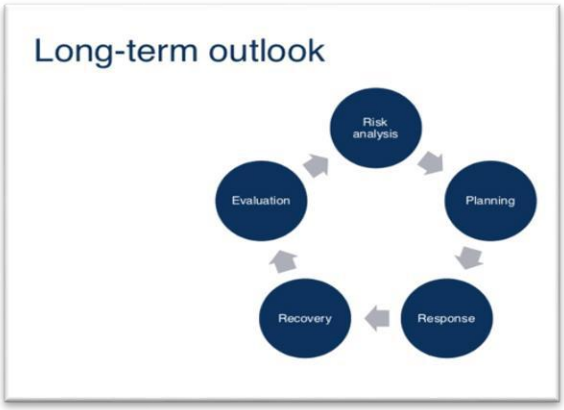
Panel 3 started with a look at the broader impacts of COVID-19 on maritime security, both in the short and medium term. The following presentations then focused on tackling maritime security challenges in a pandemic environment, for example through maritime interdiction and through autonomous systems employed by navies.

Two case studies then highlighted potential means of addressing specific maritime security challenges, namely the question of contested maritime boundaries in the South China Sea as well as the problem of risk analysis at sea through advanced analysis capacities. The final presentation then looked at the potential role of navies in the coming years.

Panel members:

- Dr. Dirk SIEBELS, Senior Analyst, Risk Intelligence
- Commodore Panagiotis PAPANIKOLAOU, Commander, NMIOTC (Greece)
- Capt. (N) Daniel-Cornel TANASESCU, Romanian Naval Forces (Romania)
- Dr. Keiko KONO, International Law Researcher, CCD COE (Estonia)
- Ms. Gözde BOZTEPE KARATAŞ, Software Engineer, HAVELSAN (Turkey)
- Mr. Sam ZWOLINSKI, Surface Warfare Analyst, Maritime Warfare Centre (United Kingdom)

Dr. SIEBELS began the discussion by highlighting that there has been no significant change in maritime security-related threats due to the COVID-19 situation. However, existing challenges remain, ranging from crime-driven threats such as piracy to geopolitical rivalries with a potential knock-on impact on commercial shipping. Local and regional conditions remain the most important factors to assess when it comes to changes in threat levels.



Despite the lack of immediate impacts, the pandemic is likely to influence maritime security in the coming years. On the one hand, it may lead to or accelerate economic changes with an impact on the maritime sector. On the other hand, tasks conducted by navies and other maritime agencies are likely to increase even further while governments around the world will rarely be able to increase available budgets. To be able to 'do more with less', it is important to outsource traditional responsibilities and embrace innovative solutions in cooperation with NGOs or the private sector.

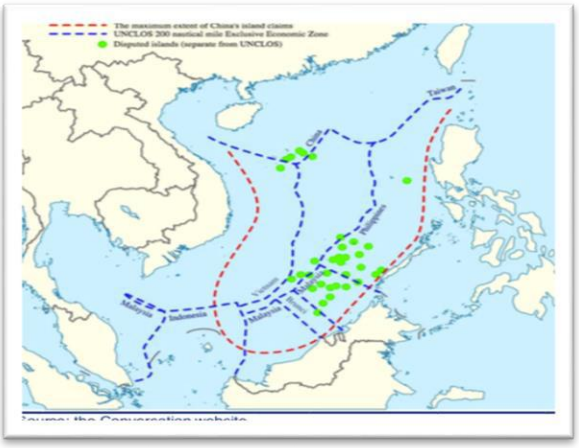
Commodore Panagiotis PAPANIKOLAOU then explained how NMIOTC is constantly analysing global maritime challenges and changing requirements for maritime interdiction operations. He pointed out that intercepting threats early and at range is 'a key area where NATO can genuinely add value to the international community's efforts to enhance maritime security'.

Commodore PAPANIKOLAOU stated that, in general, the maritime environment is characterised by complexity and diversity. He also underlined that, at the same time, this environment does not only offer freedom for legitimate operations, but also for activities threatening the free flow of commerce or even the security of nations. Moreover, the importance of the sea is likely to increase even further in the coming years, meaning that the role of maritime security forces will also become more prominent.

Capt. (N) Daniel-Cornel TANASESCU provided a short analysis of the use of maritime autonomous systems. He highlighted that the impacts of measures to curb the spread of COVID-19 may lead to even more instability around the world. Significant changes to the security architecture in general and maritime security in particular are therefore very likely, including a potential reduction of defence budgets and a subsequent reduction in naval deployments.

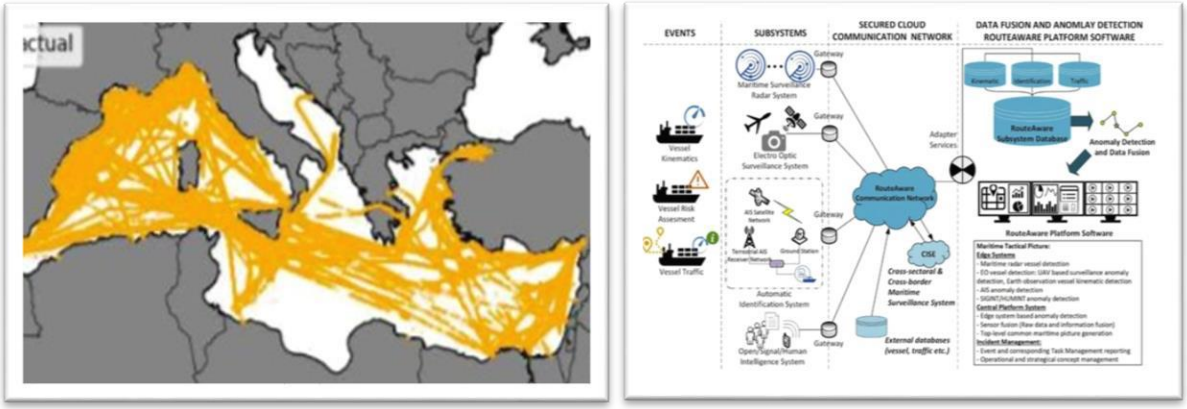
Short-term losses in operational readiness and longer-term limitations in the availability of military assets are two noteworthy results of the current pandemic. According to Capt. (N) TANASESCU, autonomous systems will therefore become an even more vital part of naval forces. These systems could even allow for a completely new approach to undersea operations, yet it will not be enough to rely merely on technical developments. The success of operating autonomous systems also depends on changes in organisational structures, adjustments of relevant concepts and shifts in operational and tactical paradigms.

In the next presentation, Dr. Keiko KONO looked at the issue of maritime boundaries, concentrating on the South China Sea. While China claims historic rights in this region and has expanded its activities there steadily in recent years, the dispute has already been on the agenda of ASEAN, the regional economic community in Southeast Asia, for decades. Dr. KONO highlighted that all countries involved in the dispute are legally bound by the United Nations Convention on the Law of the Sea (UNCLOS), yet their interpretation of specific provisions is different from that of many Western countries.



During the ASEAN summit in June 2020, progress regarding the Code of Conduct in the South China Sea was announced. Even though the pandemic has delayed further negotiations, the process remains ongoing. According to Dr. KONO, this could even lead to a *lex specialis* in the future, taking into account economic ties and other links between virtually all ASEAN members on the one side and China on the other. An agreement to sign and ratify a legally binding code of conduct for the region would have a significant impact on maritime security in the region.

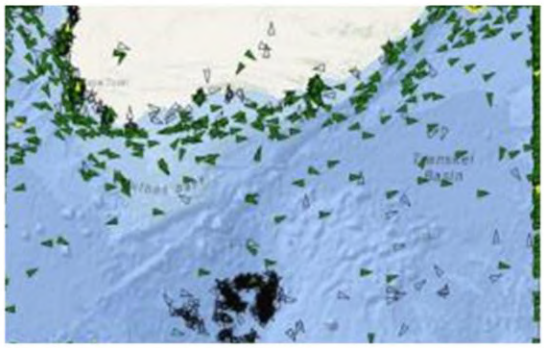
Ms. BOZTEPE KARATAŞ continued the discussion with a look at HAVELSAN's efforts to improve risk analysis at sea through the use of advanced analysis methods, combining data gathered with a different system. Among other things, the aim of such an integrated maritime surveillance system is to identify anomalies in a particular region of interest as soon as possible.



The system would provide navies and law enforcement agencies with better maritime situational awareness. Some aspects could also be of use to the private sector, for example related to due diligence efforts regarding potential business partners. Furthermore, as Ms. BOZTEPE KARATAŞ pointed out, the ongoing efforts will further improve HAVELSAN's surveillance solutions, assisted by advances in sensor technology and processing capacities.

In the final presentation of Panel 3, Mr. Sam ZWOLINSKI provided some answers to an important question related to maritime security: How can navies serve their countries at the start of a transformative decade? Issues related to COVID-19 have amplified problems caused by other long-term trends such as climate change or failures of governance in many regions of the world. Using the price of oil as a case study, Mr. ZWOLINSKI pointed out that the unprecedented behaviour of oil prices in the first half of 2020 was caused in large part by factors that had been present much earlier.

Month	Tankers through...	
	Suez Canal	Cape of Good Hope
Jan 20	289	271
Feb 20	279	292
Mar 20	284	288
Apr 20	338	334
May 20	306	355
Jun 20	222	314
Jul 20	205	373
Aug 20	192	329



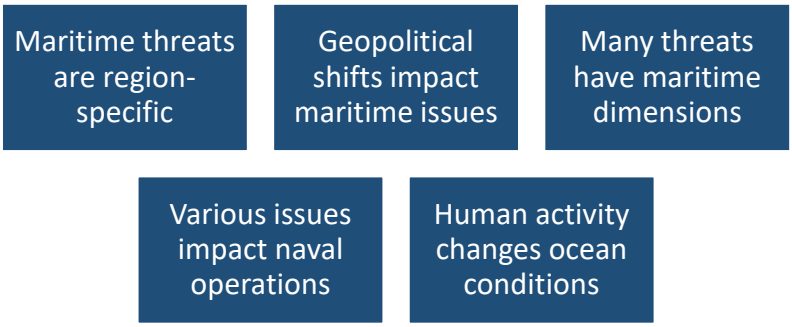
Fluctuations in the oil market have very complex causes and consequences, including in the maritime environment. Events in 2020 have once more underlined that 'all nations depend on the sea' and that credible naval forces are a 'strategic enabler'. Since the provision of maritime security in the coming decade will demand cooperation, discipline and foresight from all nations, Mr. ZWOLINSKI argued that NATO should embody active presence, agility and assertiveness to reshape norms and precedents in concert with a changed—and changing—world.

Summary

Conclusions

This section provides a brief overview of the conclusions drawn from the discussions during the Maritime Security Conference-2020. The conclusions are listed under the most relevant of the three main objectives for the conference. It should be noted, however, that some of the conclusions listed below fit within at least two of the main objectives. Moreover, the list provided here is merely a preliminary outcome that will be analysed in much greater depth in the proceedings of the conference.

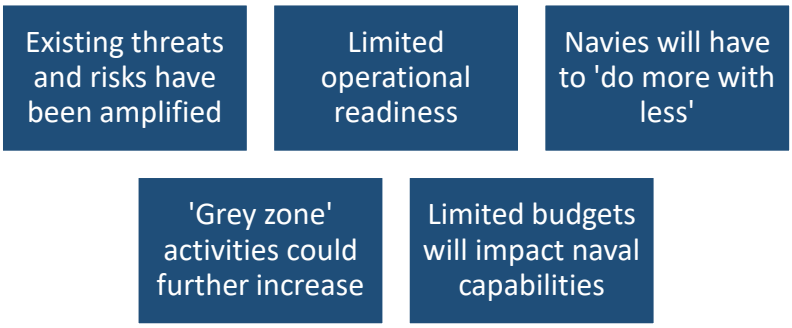
Objective 1: Understand the multitude of challenges related to maritime security that can be identified in different regions as well as the knock-on impacts these challenges may have on the tactical, operational and strategic levels.



Key conclusions

- ***Different regions around the world are facing different types of maritime threats***; these are often closely linked to land-based issues and developments that require a thorough analysis of the actual impact on the maritime environment.
- ***Geopolitical shifts are ongoing around the world***, leading to a more fragile situation in many regions ***with an impact on maritime issues*** in general and naval operations in particular.
- ***Traditional security policy still has to tackle threats on the national level*** but is ***shifting increasingly to the regional or even continental level*** as most of today's threats are transnational in nature and often have at least some maritime dimension.
- ***Naval operations have to take into account an increasingly complex number of issues***, ranging from legal aspects and economic patterns to commercial maritime operations and related infrastructure.
- In the long term, ***navies and other maritime agencies may have to face significant changes in operational conditions*** due to the ***impact of human activity*** on the oceans.

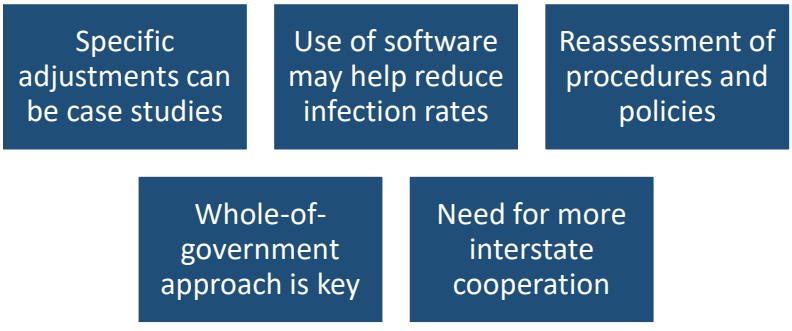
Objective 2: Provide a multi-faceted perspective on how different maritime security challenges may be influenced by the global pandemic.



Key conclusions

- While COVID-19 has not led to an immediate increase in threat levels, ***the pandemic has amplified certain trends*** as well as some associated threats and risks that had already been present and should be monitored closely.
- ***The pandemic has already led to short-term losses in operational readiness*** **and** ***longer-term limitations in the availability of naval assets.***
- ***Navies and other maritime agencies will generally have to 'do more with less'***; they are facing an increasing number of challenges, yet most governments are unlikely to be able to increase available budgets, creating the need for innovative solutions and leading to more outsourcing of traditional responsibilities.
- ***'Grey zone' activities***, potentially supported by states, ***may increase in the near future*** while the main focus of most governments remains on the health sector and economic impacts of measures to curb the spread of COVID-19.
- ***Naval capabilities***—exemplified by intelligence, surveillance and reconnaissance—***require constant updates due to technological advances and the need to increase resiliency***; future investments may be complicated by governments facing revenue shortfalls and spending priorities in other areas.

Objective 3: Present and discuss potential operational adjustments, advanced technologies and other means to tackle maritime security challenges during and after the COVID-19 outbreak.



Key conclusions

- ***On the tactical and operational level, adjustments have to be made*** while also allowing military personnel to conduct their main task; adjustments to specific types of operations—for example, countering CBRN-related threats—provide important case studies for other areas.
- ***Existing software***, specifically solutions for data analysis, ***can provide a starting point to build systems aimed at monitoring the spread of a virus*** and, by extension, reducing infection rates.
- ***Protecting crews on naval vessels from the spread of COVID-19 may lead to reassessments of current procedures and policies***, such as required manning and training levels.
- ***Challenges in the maritime environment have to be addressed by a whole-of-government approach on the national level***, creating the foundation for multinational cooperation.
- ***Interstate cooperation***—which is often linked to the maritime environment—***offers the potential to counter transnational threats***, helping to create an environment that allows for economic growth and development.

Last, but not least, the quick polls conducted during the conference were a very good tool to make the next events even more useful to the attendees. However, we obviously invite additional comments and other feedback as well. Generally speaking, the polls showed that the following topics were regarded as the best and most relevant presentations: 'Confined and Shallow Waters - A Challenging Operational Environment', 'Outlook on Maritime Security Challenges in a Pandemic Environment' and 'Improving Readiness and Protection of Crews to Maintain a Reliable Maritime Security Level in a Pandemic Environment'.

In addition, the poll 'Which of the following topics do you think will contribute most to maritime security challenges in the future?' showed that the conference attendees are mostly interested in 'Unmanned Systems in Maritime Security Operations' and 'Cyber Intelligence in Maritime Security'.

Findings and Recommendations

The following findings and recommendations are drawn from the presentations and subsequent discussions during the Q&A session and are forwarded as possible items for discussion/action for MARSEC COE's or other COEs' schedule of seminars, workshops and conferences in 2021.

Finding 1.1: The types of maritime threats that are present in different regions around the world are diverse and often linked to land-based issues.

Recommendation 1.1.1: MARSEC COE, in cooperation with other stakeholders such as Centres of Excellence, NATO Training and Education Facilities (NETFs) and NATO entities, should explore the possibility of *region-specific seminars or conferences*, possibly followed up by standing working groups dedicated to specific regions such as an 'irregular immigration working group' that covers the consequences for merchant shipping stemming from the attitude of states towards irregular migration. Additionally, to illustrate, Black Sea Symposiums could be great venues to meet at the same table to discuss regional-specific developments.

Finding 1.2: Ongoing geopolitical shifts around the world are likely to have a broad range of impacts on naval operations.

Recommendation 1.2.1: MARSEC COE should continue to monitor ongoing developments and explore *potential partnerships with relevant institutions not only within NATO, but also with the other countries (partner nations/non-NATO entities).*

Finding 1.3: Naval operations are influenced by an increasingly complex number of issues, ranging from legal questions to commercial activities at sea, budgetary limitations in maritime security operations and the long-term impact of climate change on the world's oceans.

Recommendation 1.3.1: In parallel to Recommendation 1.2.1, MARSEC COE should continue to monitor ongoing developments and conduct focused research in *coordination with relevant centres of excellence within NATO and/or other partners* with the necessary expertise. This could result in thematic seminars or conferences as well as comprehensive studies to feed into ongoing deliberations within NATO.

Finding 2.1: The COVID-19 pandemic has amplified certain threats and risks related to maritime security and should be monitored closely due to the dynamic situation that complicates predictions.

Recommendation 2.1.1: MARSEC COE should continue to monitor the impacts of measures to *curb the spread of COVID-19 on maritime security-related issues* by organising interagency activities such as the MARSEC Conference so as to gather/gain pandemic-specific experiences and expertise, also developing research or study papers.

Finding 2.2: The pandemic has created challenges regarding the operational readiness of naval forces within NATO and could limit the availability of naval assets in the medium to long term.

Recommendation 2.2.1: MARSEC COE could try to *establish a common methodology to identify the actual impacts of the COVID-19 situation*, allowing for recommendations and procedures to limit these impacts now and in similar situations in the future by drawing on current networks of the COEs. So far, the results of the pandemic have been obtained generally from virtually conducted activities.

Recommendation 2.2.2: Expand the methodology to identify longer-term impacts and to develop plans and contingency measures.

Recommendation 2.2.3: To illustrate, this crucial pandemic condition could be implemented in the EXER MARSEC-21 (CPX) Incident Development Workshop and also the scenario of the exercise so as to develop the MARSEC Crisis Response Plan (CRP) considering the findings before and after COVID-19.

Finding 2.3: Navies and other maritime agencies will likely have to 'do more with less' in the future. Despite an increasing number of challenges and the need to constantly upgrade capabilities due to technological progress, relevant budgets are unlikely to increase as governments are likely to prioritise spending in other areas in the coming years.

Recommendation 2.3.1: *The Maritime Information Sharing Working Group (WG) framework, hosted by CJOS COE, could engage in discussions regarding the potential use of private-sector solutions* to provide alternatives to bespoke technology developed solely for military purposes.

Recommendation 2.3.2: In cooperation with relevant stakeholders such as centres of excellence, NATO entities etc., *discussion forums with solution providers in different areas*—beyond the traditional industry partners focusing on military procurement—could be established. Technology with potential use in the area of intelligence, surveillance and reconnaissance could provide a good starting point to such discussions, initiated by CJOS COE.

Recommendation 2.3.3: Given that MARSEC COE has already submitted to HQ SACT two Concept Development Initiative Proposals with the aim of supporting the development of maritime security-related concepts for NATO, MARSEC COE ought to continue to develop the 'Cyber Intelligence in MSO Concept'[2] and 'Usage of Unmanned Aircraft

[2] *The Cyber Intelligence in MSO Concept* aims to enhance operational cyber MSO capabilities to provide up-to-date know-how on cyber incidents and operations with the underlying theoretical background by providing ability to draft and manage cyber risk mitigation strategy, such as proper legal and compliance steps and a deep understanding of different types of cyber attacks, the business/industrial systems that are vulnerable to risk and the importance of an organisation-range approach to cyber attacks.

Systems (UAS) and Unmanned Maritime Systems (UMS) in Maritime Security Operations (MSO) Concept'[3].

Recommendation 2.3.4: MARSEC COE should re-engage with the relevant WG(s) regarding the development of the NATO MSO Doctrine and also should lead the workings of establishing a separate education discipline for 'Maritime Security' with the NATO MSO Doctrine within the scope of its focus areas (tasks) by taking the role of the Department Head of the 'Maritime Security Discipline'.

Finding 2.4: 'Grey zone' activities may increase in the near future while many governments around the world are focused on the domestic impacts of the pandemic.

Recommendation 2.4.1: MARSEC COE could explore the possibility of conducting activities together with other stakeholders such as the European Centre of Excellence for Countering Hybrid Threats, the NATO Emerging Security Challenges Division (ESCD) and the Energy Security (ENSEC) COE, *focusing on hybrid threats in the maritime environment.*

Recommendation 2.4.2: MARSEC COE could invite private sector representatives to discuss their strategies to increase resiliency and mitigate risks for critical maritime infrastructure, which is often operated by private companies. In 2021, MARSEC COE should hold Combined Seminars such as a Critical (Energy) Infrastructure Protection (CEIP) Seminar with the related stakeholders from not only COEs, NETFs and NGOs but also academia and the private sector.

Finding 3.1: The protection of crews on naval vessels from COVID-19 may lead to adjustments on the tactical and operational level as well as reassessments of overarching procedures and policies.

Recommendation 3.1.1: In addition to Recommendation 2.2.1, MARSEC COE could try to establish an overview of changes that have already been put into place or that are currently under consideration, on the NATO and/or the member-state level, by drawing on the current networks of the COEs. This could lead to a valuable set of lessons learned, which could benefit all NATO members and other partner countries.

Finding 4.1: The results of the poll question 'Which of the following topics do you think will contribute most to maritime security challenges in the future?' showed that 'Unmanned Systems in Maritime Security Operations' and 'Cyber Intelligence in Maritime Security' are the most interesting topics.

[3]Unmanned systems have been used as platforms for the collection of intelligence, surveillance and reconnaissance and have enhanced the MSA by providing more accurate and sustainable data. The adaptability, versatility and cost-effectiveness of unmanned systems have been indispensable to successful maritime operations. *The UAS & UMS in MSO Concept* will focus on responding to the question of how we can use unmanned systems in maritime security operations more effectively.

Recommendation 4.1.1: MARSEC COE should continue to develop its ongoing concepts regarding 'Unmanned Systems in Maritime Security Operations' and 'Cyber Intelligence in Maritime Security' in cooperation with other stakeholders.

Recommendation 4.1.2: The next MARSEC Conference could be held with the main (tentative) theme of 'Unmanned Systems in Maritime Security Operations' or 'Cyber Intelligence in Maritime Security' in accordance with the poll results.

CONFERENCE PAPERS

PANEL-I
(OVERVIEW OF MARITIME SECURITY CHALLENGES)

INTRODUCTION

During the Maritime Security Conference-2020, the first session provided an overview of the extremely broad and diverse range of potential challenges to maritime security. The following three articles are a very good representation of the diverse topics discussed at the conference. These and related issues will certainly be debated much further in the months and years to come.

The first article provides a summary of the increasing role of maritime power in geopolitical conflicts, particularly on the regional level. It is followed by a case study from Bulgaria which highlights the impact of geopolitics on a national maritime strategy. The final article in this section then looks at the Northern Sea Route as an area of potential competition in the maritime environment over the course of the coming decades.

Eastern Mediterranean and the Gateway Regions as a threat to national and international security[1]

Emre Baysoy[2]

1. Introduction

After the end of the bipolar world, the global security structure faced a qualitative change. Elements of security have also changed. These elements include sovereignty, power, nation-state, region and regionalism. Within this framework, while regions and regionalism have become a unit of analysis, they have also gained a geopolitical value. The fact that many threats of the new security environment are regional and affect the respective region also contributed to this situation. Therefore, the phenomenon of regionalism is of central importance in the contemporary world.

In this context, the Eastern Mediterranean is coming to the forefront in international security. It can be said that the Eastern Mediterranean may be the region where the parameters of the world after the Cold War were shaped and will be shaped. This process of competition is ongoing, and regionalism is becoming an instrument with different understandings and practices in this process. Therefore, regionalism becomes a lever of control and power, especially in the process of changing the geopolitical structure of the Eastern Mediterranean. In this restructuring era, the historic geopolitical character of the region gained a new context and the region's security structure which depends on a classical balance of power is under pressure of change.

In the early 21st century, the international security environment is in a qualitative transformation stage. The hierarchical approach of realism and its high politics-low politics categorization of politics is becoming inadequate. Therefore, all military, political and economic dimensions should be examined in a comprehensive manner.[3]

The fact that new threats are independent of a particular situation and place paradoxically increased the importance of the political sphere, and thus geopolitics. This fact is particularly evident in the Eastern Mediterranean region, where threats such as radicalism, terrorism, poverty and illegal immigration can be observed. Firstly, these threats are mostly situated in this region. Secondly, due to the geopolitical location of the region, these threats have a potential to expand towards Europe, the Balkans, Asia and Africa. Therefore, the EU as a pre-emptor tries to develop geostrategic expansion towards the region to take precautions against these threats. In this context, Cyprus Island and the Eastern Mediterranean in general become extremely significant for the EU, along with North Africa.

[1] This study is revised and an English version of the PhD thesis titled 'Revolving Geopolitics of the Eastern Mediterranean in the Context of Regionalism', 2012, Strategic Research Institute, Turkish War Colleges, Istanbul.

[2] Asst. Prof. Dr., Namık Kemal University, Department of International Relations. ebaysoy@nku.edu.tr

[3] Faruk Sönmezoğlu, *Uluslararası Politika ve Dış Politika Analizi* (Istanbul: Der Yayınları, 2005), 744-749.

From these points, the Eastern Mediterranean comes to the forefront as a geopolitical centre in the new security environment and becomes a target of various geo-strategic incentives to the region. Geopolitics preserves its importance as a decisive factor in states' foreign policies and their grand strategies.[4] Thus, it is important to address geopolitics in relation to today's two main trends: segregation and integration. These are occurring in the Eastern Mediterranean. On the other hand, regionalism as a unit of analysis constitutes the operational dimension of today's threat analysis especially in the Eastern Mediterranean. In such a conceptual context, the transformation of Eastern Mediterranean geopolitics can be examined.

2. Defining a region: Eastern Mediterranean

Today, the international system is in search for a new equilibrium to achieve global stability. The end of the bipolar system prompted intra-regional dynamics as well as intra-regional and exterritorial actors to try and obtain the most advantageous position in the new global order. In other words, states entered into an effort to establish a strategic area dominance in the classical sense. The presence of several boundary and territory disagreements in the region also increases the potential of conflicts.

The concept of region does not have a single definition. It is described by varied disciplines and approaches in different ways. A region can be defined according to geographical, identical, functional aspects as well as political and economic criteria. With a very general definition, a region can also be said to be an area of observable interaction between actors and institutions in a specific geographic area.

In general terms, before the Mediterranean was used as a systematic form of analysis of international regionalism and emerged as a theoretical approach, regions found a place in world politics only for practical purposes. Since the first political communities, economic and political relations have had a regional focus due to technological, commercial and communicative limitations.[5] Regions have also been important in the formation of most imperial systems. In the pre-modern period, the world system was expanded to acquire existing states and independent territories, thus removing the separation of independent territories from world politics.[6]

[4] Jakub J. Grygiel, *Great Powers and Geopolitical Change* (Baltimore, MD: Johns Hopkins University Press, 2006), 1.
[5] Andrew Hurrell, "One World? Many Words? The Place of Regions in the Study of International Society," *International Affairs*, Vol. 83(1) (2007):128-129.
[6] Barry Buzan and Ole Waever, *Regions and Powers: The Structure of International Security* (Cambridge: Cambridge University Press, 2003).

Although the region is defined geographically in line with the above information, the Eastern Mediterranean is not defined around geographical limitations. In today's security environment, the Eastern Mediterranean has gained the characteristic of being a region whose dimensions change according to the subject and threats, not only with reference to geographical and cultural features.

Today, the Eastern Mediterranean is the core of the Middle East, the Caucasus and Central Asia. These regions are a synthesis of the properties of all regions, displaying a dynamic area centre image in today's security environment. It is a centre where threats are concentrated in the new security environment. Due to this core location, the boundaries of the region can be determined in different ways according to the impact area of each threat. Therefore, the Eastern Mediterranean can expand and multiply spatially according to the subject, threat and functions. For example, the energy subject zone is narrowed on a horizontal line; it can be extended to the Maghreb countries and the Caucasus. When it comes to terrorism, the boundaries of the region become more ambiguous or even disappear.

At this point, while defining the Eastern Mediterranean, it is necessary to explain the terms Eastern Mediterranean and Levant, which are used interchangeably as synonyms but actually refer to two different phenomena. While Levant, which means "the place where the sun rises", is a term belonging to more historical and pre-modern times, the Eastern Mediterranean has emerged in the modern period.[7] Until the 19th century, "Levant, Syria" was limited to the coastal regions of Anatolia and Egypt, the cosmopolitan merchants expressed by the society in Beirut, Izmir and Alexandria. Therefore, the Levant is a geographically narrower definition of the Eastern Mediterranean, but broader in terms of subject scope.

The fact that the Eastern Mediterranean region has different definitions according to time, situation and subject constitutes a dimension of the geopolitical method of this study. This kind of geopolitical understanding allows regions to be studied in a multidimensional way, rather than within the framework of geographical restrictions and laws. Regions are ‘formed not within the framework of physical or cultural boundaries, but by the coincidence of different benefits and perceptions’[8]. Historical events, symbols and memories play a major role in the occurrence of their environment as a territory in politics.

As a result, the Eastern Mediterranean region emerges in narrow, medium and broad meanings that do not have definite and clear borders, and cover different areas in different conjunctures, periods and different subjects. The definition of the Eastern Mediterranean in terms of a strategic region and characteristic features can be determined in light of historical

[7] William Harris, *Levant* (Istanbul: Literatür, 2005), 2-3.
[8] Oliver Kessler, Jan Helmig, "Of Systems, Boundaries, and Regionalisation," *Geopolitics*, Vol. 12 (2007), 570.

events and facts. The boundaries and elements of this perspective are determined by the general political conjuncture.

3. Geopolitical Features of the Eastern Mediterranean

It is necessary to determine catalytic indicators to comprehend the international system. In this context, relative decrease occurs in the significance of classical-ideological factors in the new international security environment and today, there is a relative increase in the significance of socio-cultural and economic-political factors.[9] In this respect, spatial dimensions of problems and threats start to make sense to the extent that they affect the security perception of geopolitical political units and the political-strategic decisions taken. Counter measures taken against these problems and threats also gain importance.

The Eastern Mediterranean is one of the main arteries of raw material flows, notably on important sea routes crossing the region. The struggle for control of sea routes, gates, straits, canals and vital points remains important. The struggle for geopolitical power and sovereignty in the Eastern Mediterranean intensifies with the participation of intraregional and exterritorial actors. In this context, the region also protects its important role in history and remains in a determinant geographic position for most international actors.

Geopolitical features of the Eastern Mediterranean in light of the events that took place in the history of the region until the modern period can be listed as follows:

1. The fact that its borders are open in all directions encourages attacks.
2. The region is a position to be used to put pressure on neighboring countries and is a source of distrust for regimes that cannot dominate, rule or calm them.
3. Due to the centrality of the region between Europe in the West, Africa and East Asia and its importance for trade and energy routes, the Eastern Mediterranean attracts the attention of great powers.
4. The region does not have a unifying geographical feature despite the cultural partnership elements.
5. Nation-state / nationalization efforts have largely been left unfinished, making the region suitable for radical movements.
6. Conflict tendencies due to the fact that regional states bring their geopolitical features to the forefront in search for legitimacy; therefore, regional powers can make powerful non-regional actors intervene in line with their interests.

[9] Faruk Sönmezoğlu, *Uluslararası Politika ve Dış Politika Analizi* (Istanbul: Der Yayınları, 2005), 746.

4. Gateway regions and regional security

One important threat for nation-states are events and facts that can be defined as 'neo-tribalism' or 're-tribalism' under the guise of separatism and reaction. Within the developments of globalization and post-modernism, neo-tribalism has begun to find legitimacy and support in national, international and trans-national areas and legitimacy is gained as a building block of the new security environment.

Tribal formation is glorified with the 'starfish metaphor'[10]. It describes the success that Native American tribes had against the Spanish due to their tribal structures. In this direction, it is argued that new security theories can also gain importance. In particular, some understandings of regionalism offer a theoretical framework for neo-tribal formations. Bjorn Hettne states that 'national disintegration must be replaced by region (local) building and security communities created'[11] and presents regional security communities as a suitable model for the post-sovereign world. Thus, in the new security environment, it can be thought that the security of the Mediterranean is trying to be realized by disrupting the existing socio-political orders.

The 'destruction of the traditional concept of power' and 'the independence of different elements of power'[12] during the Cold War also play a role in the formation of this result. For example, it can be stated that while the Soviet Union was a military superpower in the past, it was extremely weak economically, while the opposite was the case for Japan. In reality, it can be considered that power factors are the same on a wavy curve.

First of all, balance is a static concept that consists of rigid and unchangeable arrangements in which there are clear boundaries between parts and continuous control is required. Equilibrium refers to a network-like situation in which opposing influences and trends are proportionally balanced in an open system.[13] States are the main means of preventing the problems and threats that exist in a state of equilibrium (and in accordance with the character of the threats).

Global imbalance is a function of change in geo-strategic areas (realms) as well as between areas and their geopolitical regions. If imbalance arises from entropic differences of great nation states, and as power dissipates within the evolving world system, the system increases its ability to cope with the shock of change. The evolution of the world system depends on

[10] Ori Brafman, Rod A. Beckstrom, *The Starfish and the Spider: The Unstoppable Power of Leaderless Organizations* (New York: Penguin, 2006), 9-29.
[11] Björn Hettne, "Teori ve Pratikte Güvenliğin Bölgeselleşmesi Uluslararası İlişkiler," *Uluslararası İlişkiler*, Vol. 5(18) (2008).
[12] Henry Kissinger, *Diplomasi* (İstanbul: İş Bankası Yayınları, 2004), 7.
[13] Saul B. Cohen, "Global Geopolitical Change in the Post-Cold War Era," *Annals of the Association of American Geographers*, Vol. 81 (4) (1991), 557.

such a change.[14] In this context, globalization and regionalization can also be considered as a precaution against the potential of the asymmetric structure of the entropic power distribution between states to become a source of instability through the distribution of power within the system.

Problems and threats such as securitizing the development discourse, start to follow confrontational policies of regional states in their immediate surroundings. Among other things, increasing competition in the energy field can be evaluated within this framework. Upon the understanding that revisionist states in a region cannot be prevented with the realist classical balance of power policies immediately after the bipolar order, and the evaluation that existing state structures are inadequate in addressing new problems and threats, it can be argued that stability may be achieved by transforming the structures of political units and with new political actors.

In this context, the Eastern Mediterranean was a 'shatter belt' during the Cold War, while today it has gained the character of a sub-geopolitical region. The Eastern Mediterranean can therefore be thought of as being built in order to be perceived and noticed within the framework of regionalism. As a sub-region, the building elements of the Eastern Mediterranean are not nation-states, but micro-scale socio-cultural, economic and political units, contrary to previous periods.

This situation can be explained with the concepts of 'gateway region' or 'entrance gate region' in terms of geopolitics. Passage or entrance gate regions can have a wide variety of characteristics and can be politically and culturally distinguished. What is meant by gateway regions and states are semi-sovereign regions and states that have gained an integrating function of transnational forces that have risen economically and socially with the globalization process. Such states and regions have the ability to control the centrifugal resistance caused by the 'ethnic nationalist Balkanization' process and integrate them into the system.[15]

Gateway regions connect strategic land and sea areas to each other and become a kind of supranational areas where goods, services and ideas are spread. Eastern Europe and the wider Middle East can serve as an example for such gateway regions. This system may create small-scale exchange states with limited sovereignty that allows the parts of the system to be articulated. Gateway states become micro-states specialized in certain sectors (e.g. tourism, agriculture, banking). Thanks to these states, the world system can gain a more flexible and dynamic character.[16]

[14] Ibid.
[15] Cohen, "Global Geopolitical Change", 554.
[16] Cohen, "Global Geopolitical Change", 575.

The most important event in the process of change is the transformation of political units undergoing 'architectural changes'[17] in the face of a new situation. Regroupings occur at the global, regional, national and sub-national level and the geopolitical view of the world becomes multi-dimensional.

The evolution of the global geopolitical system is in line with wider development processes. This transformation offers features of a flexible hierarchy. As the parts specialize, the world system gains a more integrated character. Therefore, in summary, transition regions and central states play an intermediary role in providing the integration that globalization brings and needs.

5. Conclusion

Within the framework of the changing political and security environment, basic geopolitical characteristics of the Eastern Mediterranean are constantly developing. In this context, regionalism gains value as a geopolitical tool and forms the basis of radical economic-political transformations by helping to control micro-scale elements on a regional basis. Thus, with a new focus towards the Eastern Mediterranean, the region is under pressure to transform into an area where a kind of 'condominium' is applied and differences in the security understandings between, for example, the European Union and the United States can be overcome.

Renewed geopolitics in the Eastern Mediterranean manifests itself in three dimensions. First, unitary states that constitute the political elements of the region are under pressure to change while sub-national groups gain weight as new actors. Second, sovereign boundaries are also under pressure. Third, socio-political identities in the region are transforming.

In this respect, the Eastern Mediterranean is seen as an alternative model of modernity to the nation-state notion.[18] The region, which emerged with a modern understanding in the previous period, is wanted to be transformed into the 'Levant' of today's cosmopolitan postmodern world. However, this threatens both regional and international security and stability as well as national security.

Finally, it is possible to claim that:

- Changing geopolitics generate tensions in regions like the Eastern Mediterranean.

[17] William H. Overholt, *Asia, America, and the transformation of geopolitics* (Cambridge: Cambridge University Press, 2011), 26.
[18] Paolo Giaccaria, Claudio Minca, "The Mediterranean alternative". *Progress in Human Geography*, Vol. 35 (3) (2011).

- Threats like terrorism and radicalization somewhat legitimize geopolitical projects such as building of gateway regions by using subnational groups, at the expense of national state structures.
- Rather than being a solution to the threats, this attitude arguably increases threats even further.

Maritime power becomes vital for preventing trends like new tribalism which can be seen as the main cause of national and regional instability. To deal with the threats, maritime-based national cooperation may even be the antidote to existing problems.

The impact of geopolitical aspects on maritime strategy – the Bulgarian perspective

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1. Introduction: the security environment

In recent years, Eastern Europe has faced the challenge of a very dynamic "balance of power", combining political, military, economic and energy aspects. On the one hand, the presence of NATO and the EU has changed the geostrategic orientation of the Euro-Atlantic community; on the other hand, the region has traditionally been a crossroad between Europe and Asia.

During the Cold War, Eastern Europe was the border between the two blocs and therefore a zone of stability. The end of the bipolar world then led to the emergence of many new actors and a zone of strategic communications related to Caspian oil. Since the events of September 11, 2001, it is one of the "key" geostrategic regions in the world, considered an outpost in the global war on terror. Moreover, the Black Sea region is currently the region in which new hybrid low-intensity strategies, policies and actions are being deployed, making many current security concepts irrelevant. In this context, current maritime security strategies are often inadequate as well.

Many analysts view the strategic position of the region as a "border zone" between states of Western and Eastern civilizations, arguing that, unlike buffer zones, a "border zone" is a more sustainable dimension in geographical terms. It conditionally separates north from south and east from west and is a kind of front post of opposition between rich and poor nations. According to Sergiu Celak, the International Center for Black Sea Studies executive director, "the Black Sea is a civilizational crossroad where the influence of Orthodoxy and Islam interferes, while enhancing the influence of Western political culture."[1]

Today, three major challenges characterize the security environment in the Black Sea region: the vast disparity in military capabilities following the annexation of Crimea, the potential for hybrid warfare and the future of new energy and transport corridors linking Caspian producers and European markets. There is a disturbed "balance of power" in the modern security environment in the region, accompanied by processes of competition, regrouping, reallocation of forces and resources, formation of new strategic alliances and areas of influence in the region.

[1] Sergiu Celak et. al., "Why the Black Sea Matters", *Hudson Institute*, June 2016, 3.

The European Union is the world's leading maritime power, especially with regard to maritime transport, shipbuilding technologies, coastal tourism, marine energy, renewable energies and associated services. The EU, together with the IMO and other international organizations, should strive for the imposition of high standards of safety, environmental protection and working conditions, as well as the elimination of terrorism and piracy. Targeted transport policies in the European Union are crucial for the development of transport and the state of the economy in the community as a whole.

The Transport 2050 Roadmap for a Single European Transport Area aims to remove major barriers and obstacles in many key areas, such as transport infrastructure and investment, innovation and the internal market. The aim is to create a single European transport area with more competition and a fully integrated transport network, connecting different modes of transport and enabling a radical change in the modes of transport for passengers and freight. The implementation of the strategy for the Danube region will provide an opportunity for integrated waterway management by improving navigation opportunities along the Danube. Cross-border cooperation in the field of waterway management is also needed.

Maritime spatial planning is a key tool for a balance between sectoral interests and the sustainable use of marine resources through an ecosystem-based approach. Integrating maritime surveillance will reduce the cost for detecting, tracking, and controlling unlawful activities at sea as well as for preventing accidents or monitoring of fishing activities.

2. Geopolitical factors with a regional dimension

Security is being regionalized. Traditional power politics in today's environment have shifted from national to regional security. The new regional security environment related to the fight against terrorism, authoritarian regimes, the race for natural and energy resources, as well as rapid development of technology have changed the perspective. Moreover, the regional dimensions of opposition have also imposed new military doctrines based on local features of the security environment, particularly dominant in Eastern Europe.

Difficulties in implementing the aforementioned European maritime policies often come from opposition through implicit, covert hybrid influences. Speaking at a US Air Force event, Secretary of State Mark Esper said that US national security strategies and military doctrines call for an urgent adaptation to new conditions of low-intensity, vague and covert enemy actions, involving paramilitary forces, lobbying and the use of economic influence to achieve strategic goals.[2] Adding China's economic expansion strategy through the „One Belt, One Road" project, it can be concluded that the race for strategic dominance of leading global powers is coming back with new realities and instruments of influence.

[2] Charles Pope, "Esper emphasizes need for military to 'adapt' to confront new threats, resurgent 'great power competition'", *US Air Force*, 18 September 2019, https://www.af.mil/News/Article-Display/Article/1964782/esper-emphasizes-need-for-military-to-adapt-to-confront-new-threats-resurgent-g/

Modern geopolitical architecture in Eastern Europe is complex and a schematic division of factors is not appropriate. It is driven by the impact, in particular, of the growing military-political presence of NATO, the United States and Russia, as well as of energy geopolitics and the transformation of transport and communication lines.

NATO has deployed a Rapid Response Force based in Eastern Europe, countries in the region have increased their military budgets and stepped up patrols on land and at sea in the Black Sea and Baltic Sea. Russia has annexed Crimea, has modernized and enlarged the Black Sea Fleet based in Sevastopol, and has established control over the Crimean maritime spaces. The Black Sea area is also covered by a large number of coastal anti-ship missiles, making it relatively easy to destroy enemy navies in the Black Sea. This practically made the INF treaty (elimination of medium and short-range missiles) irrelevant and created the preconditions for a new arms race.

Given the dominance of NATO's conventional combat fleet and the limited financial framework for acquiring new conventional combat capabilities, it is appropriate to use medium-range tactical systems for containment purposes. There is no official information on the Russian tactical nuclear arsenal available, but various sources give Russia superiority in terms of tactical nuclear weapons with the Russian Navy ranked first in the world. Given the nature of the use of tactical nuclear weapons in regional (local) conflicts and at close range, political documents reveal a new perspective on the capabilities of the Russian Navy, which should not be neglected. The possession of ultra-modern (nuclear) weapons means that competition between major powers is capable of causing global or regional disaster. It is difficult to predict the future of the INF treaty. Will this crisis be used by NATO partners to restart dialogue with Russia or for reciprocal action and deployment of the same force on European territory?

Relations between the US, Russia and China are currently at their worst since the Cold War. No bilateral nuclear control regime is active, large-scale missile defense systems and new high-tech dual-use weapons are being built and deployed.

The logical consequence of these processes is the interruption and failure of all regional security initiatives. The decision in the early 1990s to ensure security in Europe through existing institutions, i.e. NATO and the EU, giving Russia the status of an associated partner at best, deepened the Ingroup-Outgroup dynamic and proved to be unsuccessful.

Another example in support of this fact: despite the conflict between Ukraine and Russia, EU sanctions, firm political statements and condemnation of Russian actions in Crimea and Eastern Ukraine, many Western companies did not give up business with Russian partners and continued cooperation particularly in the energy sector.

When Russia occupied two thirds of Ukraine's national maritime space in 2014, only a few experts suggested that the fight for control over energy resources could be one of the main causes of conflict in the Crimean region. Prior to the Russian annexation, the Crimean region was the third-largest producer of natural gas in Ukraine. The state-owned Ukrainian company Chernomornaftogaz owned 17 fields, including 13 offshore platforms in the Black Sea and the Azov Sea.

In 2018, Russian authorities announced their intention to stop economic activities in the Odessa gas field, which produces around half of Crimea's gas output. This decision is linked to the international maritime arbitration dispute that Ukraine launched against Russia in September 2016. EU companies and citizens have since been banned from buying Crimean companies or property or delivering and investing in energy and infrastructure projects. Almost the entire Azov Sea has been controlled by Russia since the opening of the controversial bridge over the Kerch Strait in May 2018.[3] However, interest in oil production near the Crimean peninsula remains.

In summary, the main geopolitical challenge for Eastern Europe, including the Black Sea region, is Russia's strategy to maintain and expand its 'sphere of international influence'. However, this process is linked to a demonstration of readiness for use of military force, which has brought the debate about territorial defense back on the agenda. Both the enhancement of Russia's military capabilities in Crimea, the Black Sea and the Azov Sea, and the termination of the INF treaty, have changed NATO and EU concepts from "collective defence" and building expeditionary forces for action in remote regions to "territorial defence and NATO border protection". The continued presence of the NATO Response Force in the Baltic Sea, as well as the „tailored forward presence" in the Black Sea region, are part of the response to protect the Eastern flank.[4]

Based on this geopolitical and regional factor analysis, we can draw attention on three main processes with a strong political-military effect on the current security environment:

- **Revolution of Military Affairs (RMA)** – a fundamental transformation resulting from major changes in weapons technology and equipment, operational concepts (doctrine), and military organization and methodology. RMA has typically been going on for decades and often replaces existing military practices. Analyzing this process, we can conclude that the Bulgarian Navy, as part of some of the most technologically and innovatively developed organizations in the world, enjoys a number of positive incentives for this technological military advantage. On the other hand, RMA presents

[3] Kostiantyn Yanchenko, „Black Sea gas deposits – an overlooked reason for Russia's occupation of Crimea", *Euromaidan Press*, 10 October 2018, http://euromaidanpress.com/2018/10/10/black-sea-gas-deposits-an-overlooked-reason-for-russias-occupation-of-crimea/

[4] Jens Stoltenberg, "Speech by NATO Secretary General Jens Stoltenberg to cadets at the Maritime Academy in Odessa", NATO, 30 October 2019, www.nato.int/cps/cz/natohq/opinions_170337.htm?selectedLocale=en

challenges: the acquisition of more advanced technologies and equipment will become more expensive and will not always coincide with the resources deployed by other allies. So, we have to identify specific military capabilities of the Bulgarian naval forces that maintain interoperability with our allies.

- **Asymmetric warfare** – a term used to describe attempts to surround or undermine an opponent's strengths using his weaknesses, employing methods that are significantly different from the opponent's usual modus operandi. Combining RMA with asymmetric threats changed the understanding of the current state of conflict. One example is the interaction of various institutions in ensuring the security of maritime critical infrastructure which is vulnerable to such asymmetric threats. In this context, it is vital to understand that a country's territorial borders may not be directly threatened by a conventional military attack, and that border security is closely linked to global problems and their sources.

- **Hybrid warfare** – malicious actions against states, nations, institutions and private entities through a wide range of overt and covert activities targeted at their vulnerabilities, aimed at avoiding military conflict to attack the more vulnerable private sector. The challenge to navies is related to understanding their existence, proper assessment and mutual coordination with other state institutions in counteracting hybrid threats. Over 80% of critical infrastructure in western countries is owned or operated by the private sector. NATO is working closely with the private sector on logistics and communications, which can have serious adverse effects during a crisis. Cybersecurity, diversification of energy supplies, or offshore communications are other potential targets of a hybrid attack. In 2017, for example, a cyberattack aimed at the Ukrainian government caused unprecedented damage to various companies worldwide, notably the Danish shipping giant Maersk. This episode highlighted the potential implications which attacks against government entities may have on the private sector as well.

3. Influences on maritime security strategies

Complex geostrategic factors, including their regional dimensions, are reflected in national security strategies, including maritime security strategies (shown in Fig. 1). One example for the impact of the environment in the overall decision-making process is the link between mission, vision, values and strategy through their specific formulation. Following this approach, a maritime security strategy builds on the overall mission of the armed forces, formulated in the respective strategies and doctrines. In Bulgaria, this includes the protection of territorial integrity, a contribution to international peace and security in the context of EU and NATO, as well as disaster relief. The strategy thus contains a clear statement of the navy's mission: to protect the country's maritime interests and national values while contributing to international peace and security

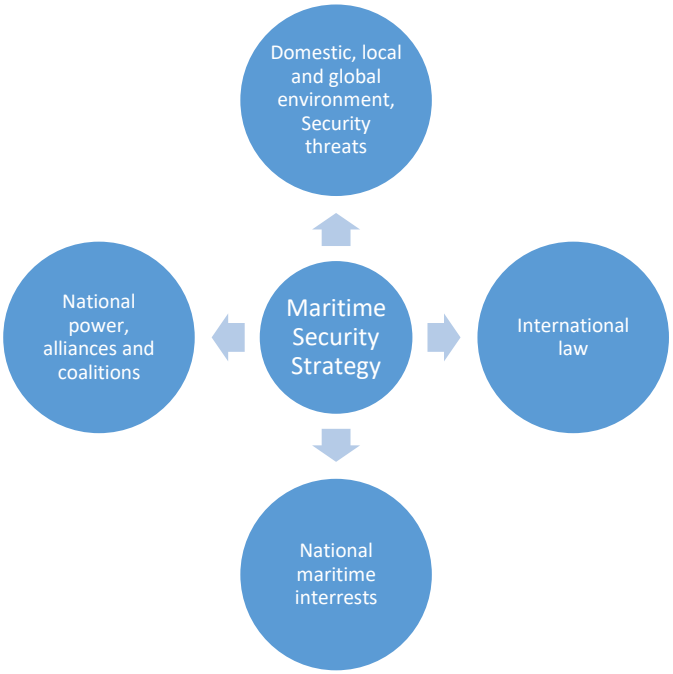

Figure 1: Aspects of a maritime security strategy

Combining the legal, constitutional, diplomatic and military role of the navy and the connections between the different roles in the contemporary security environment described above, any maritime security strategy must seek to strike a balance between naval forces, types of naval platforms and sea power forces (including merchant marine and critical maritime infrastructure). Sea power therefore includes the maritime capabilities that enable the state to achieve all policy objectives for maritime spaces designated as vital to national interests and the security of the country.

4. Conclusion

The role of national maritime spaces for a country's geostrategic, economic, energy and environmental security is increasing, highlighted by the example of Bulgaria. The need for providing naval forces with modern and adequate capabilities is increasing as well. The challenge is to define those capabilities that are particularly cost-effective, adaptive and useful in the context of the respective navy's missions, goals and vision for the future.

One major point connected with efforts for achieving a safe and secure regional environment is multilateral cooperation. The analysis of the Black Sea security environment and of geopolitical aspects shows that active engagement is vital, for example by the Bulgarian Naval Academy which assists NATO in the field of naval education in Ukraine. Since 2015, the academy has provided assistance to the Odessa Maritime Academy to establish, maintain and develop their naval department and academic curricula according to NATO standards. This engagement underlines that a modern, adequate naval capability is crucial for maritime security in the Black Sea region. Moreover, the cooperation has an "added value" since it helps to build trust and deepen existing partnerships which are the basis for diplomatic conflict solutions. After all, peace and stability are vital for economic growth and prosperity.

Examination of the ship traffic regime on the Northern Sea Route according to international maritime rules

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Introduction

Global Warming

Studies on global warming have been carried out by scientists since the 19th century. The Nobel Prize-winning Swedish author Svante Arrhenius calculated in 1896 that if the amount of CO2 in the atmosphere could be reduced by 50%, the global temperature would fall by four degrees. On the other hand, a two-fold increase in the CO2 ratio would increase temperatures by four degrees. In recent studies, the accuracy of his calculations has been confirmed, and diverse effects of global warming have been summed up under headings such as "How do we know global warming is real?"[1].

While countries have taken some precautions to prevent a further increase of carbon emissions, temperatures have increased over the past decades, shown in Figure 1. Even if CO2 emissions were to stop completely, it would take decades for atmospheric concentrations to decline, the earth's temperature would therefore remain elevated even then.[2]

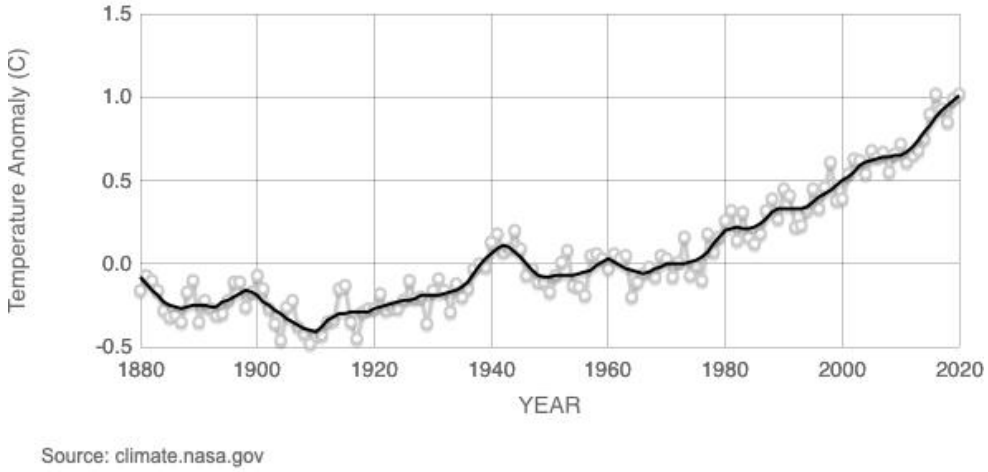

Figure 1: Global Land-Ocean temperature index between 1880 and 2020 (Source: NASA's Goddard Institute for Space Studies)

[1] William Fletcher and Craig Smith, *Reaching Net Zero – What It Takes to Solve the Global Climate Crisis* (Cambridge, MA: Elsevier, 2020), 39-60.
[2] Susan Solomon et al., "Irreversible Climate Change Due to Carbon Dioxide Emissions," Proceedings of the National Academy of Sciences of the United States of America 106, no. 6 (2009), 1704-1709.

Global warming of the planet also increases the sea water temperature. Among other things, this has started to affect the ice caps in the polar regions of the globe. In the Arctic, the sea ice extent average for September 2020 was 3.92 million square kilometers, the second lowest in the 42-year satellite record, behind only September 2012. This is 2.49 million square kilometers below the 1981 to 2010 average.[3]

Following the minimum seasonal extent, which occurred on 15 September, ice growth quickly began along in the northern Beaufort, Chukchi, and East Siberian Seas (shown in Figure 2). Expansion of the ice edge was also notable within the East Greenland Sea and within the Canadian Arctic archipelago. By contrast, the ice edge in the Kara and Barents Seas remained relatively stable until the end of the month when it started to expand, and within the Laptev Sea the ice edge retreated slightly. In addition, the boundaries drawn with magenta are the average of September 1981-2010, showing the dimension of the glacial retreat.

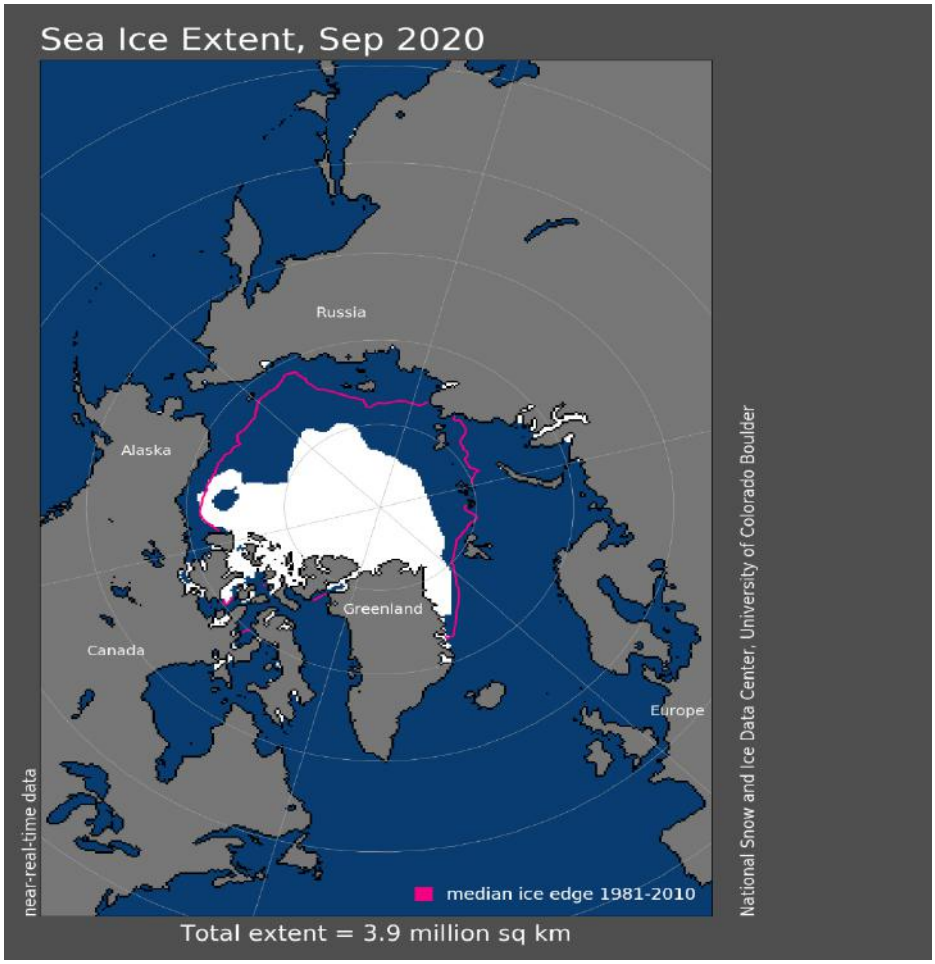

Figure 2: Arctic sea ice extent for September 2020
(Source: National Snow and Ice Data Center)

[3] National Snow & Ice Data Center, "Lingering seashore days", 5 October 2020, https://nsidc.org/arcticseaicenews/2020/10/lingering-seashore-days/.

Although the parts that melted in the summer months in the past years started to freeze again, the mass of Arctic glaciers has been continuously decreasing since 1996. This has enabled many studies on the future and usability of the Northern Sea Route (NSR) and attracted the attention of companies operating in maritime trade and transportation. The NSR, which connects Asia and especially northern Europe in a much shorter time than traditional routes, could be used more actively in the coming years. Along with this increase in traffic, discussions about which country will control passages and the prevention of environmental pollution or potential disasters has been put on the agenda. Another subject of discussion is how the freedom of navigation in the waterways opening to the high seas will function in this region according to United Nations Convention on the Law of the Sea.

2. Global sea routes

Since the middle of the 19th century, steam engines have been increasingly used on ships, reducing the dominance of wind directions to direct maritime trade routes. Maritime trade routes have also been shaped into their present form by the opening of artificial waterways, namely the Suez and Panama Canals. In addition to current primary and secondary routes, global warming and melting sea ice has paved the way for the more active use of shipping routes in the Arctic, which have been used less frequently in previous years.

The Northern Sea Route

Typically, there are three shipping shortcuts through the Arctic region: the NSR, the Northwest Passage, and a future Transpolar Sea Route. The NSR lies within Russia's exclusive economic zone and runs through the Bering Strait to the Kara Sea. Separately, the Northwest Passage is a series of connecting routes from the Arctic Ocean through the Canadian Arctic archipelago to the Pacific Ocean. The Transpolar Sea Route largely lies in the high seas and runs from the Atlantic to the Pacific Oceans across the Arctic center.[4]

Looking at the NSR in more detail, it passes along the northeastern coast of the Russia, bordered by the Black Gate in the east and Cape Dezhnev in the west. The entire route is approximately 3000 nautical miles long. The shallowest places are the Dmitry Laptev Strait (8m to 9m), the Sannikov Strait (13-15m), and the Yugorsky Strait (13m). There has been an increase in transit ship passages in the region in recent years. While 27 ships were transiting in 2017 and 2018, this number increased to 37 in 2019.[5]

[4] Zheng Wan, Jiawei Ge, Jihong Chen, "Energy-saving potential and an economic feasibility analysis for an Arctic route between Shanghai and Rotterdam: case study from China's largest container sea freight operator", Sustainability, Vol. 10:4 (2018).
[5] Comprehensive information about transit statistics on the NSR can be found on the website of the Centre for High North Logistics, available at: https://arctic-lio.com.

This route is of particular interest to companies engaged in maritime transport between Asian and northern European countries. In addition to these companies, it is seen that the icebreaker fleet operating in the region has been improved and the number of nuclear icebreakers has been increased by the Russian government[6] in order to deliver crude oil and natural gas facilities to China and Japan, the world's largest importers of these products.

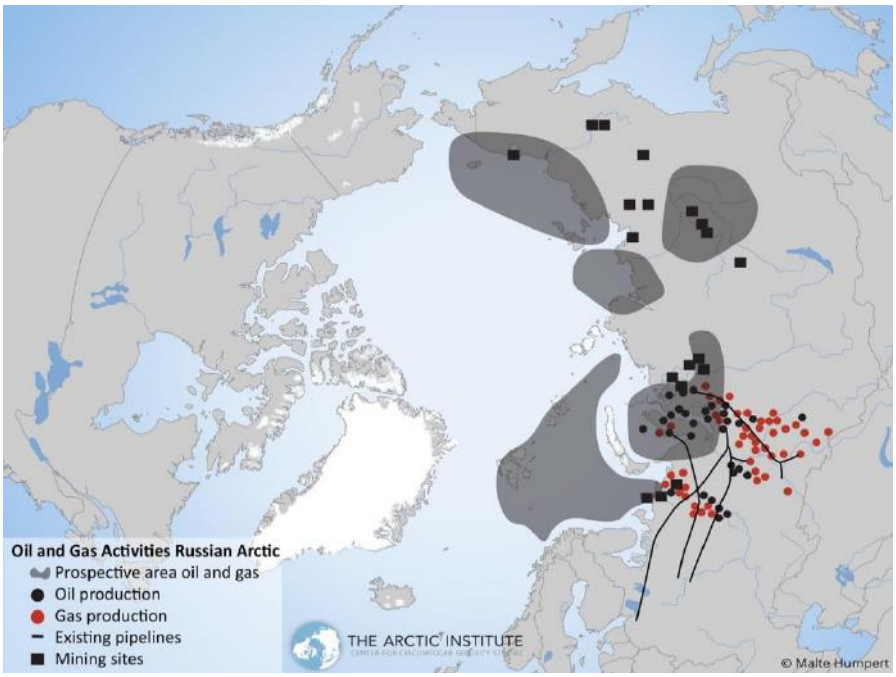

Figure 3: Oil and gas in Arctic Russia (Source: The Arctic Institute)

As shown in Figure 3, the energy resources in the region are one of the most important reasons for keeping the NSR open. In 2019, the amount of cargo carried through the NSR was 31.5 million tons, corresponding to 80% of the total amount of crude oil and LNG transported by the Novy port crude oil project on the Yamal peninsula and the Yamal LNG project. Considering that the amount of freight carried was 2.8 million tons in 2013, it can be predicted that the route will be used much more actively in the coming years. For 2020, the amount of cargo is expected to reach 32 million tons, and more active use of the route is supported as a state policy.[7]

The NSR allows for important savings in distance and time compared to traditional shipping routes. Table 1 shows values for a bulk carrier (190 meters long, 32 meters wide, draught of 13 meters and a cargo capacity of 57500 deadweight tons) proceeding from Shanghai to Murmansk at an average speed of 14 knots.

[6] Rosatom, "Nuclear Icebreaker Fleet", accessed 2 January 2021, https://rosatom.ru/en/rosatom-group/the-nuclear-icebreaker-fleet.
[7] Malte Humpert, "Cargo volume on Northern Sea Route remains stable at 32m tons in 2020", *High North News*, 30 September 2020, https://www.highnorthnews.com/en/cargo-volume-northern-sea-route-remains-stable-32m-tons-2020.

Sea Route	Distance (nautical miles)	Voyage Time (approximately)
Northern Sea Route	6,500	20 days
Suez Canal	12,059	36 days
Panama Canal	14,629	43 days
Cape of Good Hope	15,351	46 days
Strait of Magellan	18,639	56 days
Cape Horn	18,702	56 days

Table 1: Comparison of different maritime routes from Shanghai to Murmansk

Although the NSR may be very advantageous in theory, there may be differences in practice, outlined in more detail below.

Advantages of the NSR

Shorter than traditional shipping routes: As indicated in the distances in Table 1 above, the NSR is much shorter than traditional routes and around 45% shorter than its closest rival, the Suez Canal route. It is more attractive than traditional routes for companies which are involved in maritime transportation between Asian countries such as China, Japan or South Korea to Baltic countries and Northern Russia, especially at the end of summer and the beginning of the autumn season when the NSR is open.

Time and cost savings: Daily operational costs of the vessel used as an example in Table 1 vary between 5500 and 7500 USD on average. When the NSR route is used instead of the route through the Suez Canal, approximately 90000 USD savings in daily operational costs are possible.

Fewer security risk compared to the Suez Canal route: No pirate attacks were reported in 2019 in the region covering the Red Sea, the Gulf of Aden, the Arabian Sea and the overall western Indian Ocean. Hijackings of ships, however, have occurred in the past, and the security threat for merchant vessel is not over yet, underlined by frequent warnings from shipping industry associations and maritime agencies. Ship operators may incur additional costs when they employ privately contracted armed security personnel for transits through this area. Furthermore, the passage through an area with a security risk also has a negative psychological effect on the ship's crew.

Less emissions: Fuel consumption for an average ship is estimated on the basis of average characteristics of installed main engine power, main engine load, bunker fuel consumed per power unit (kW, depending on propulsion and fuel type) and days at sea (based on demand for sea transport),[8] hence the use of the NSR means less emissions with the added advantage of being 16 days shorter than the second-closest route.

[8] Øyvind Endresen et al., "A historical reconstruction of ships' fuel consumption and emissions", Journal of Geophysical Research: Atmospheres, Vol. 112:D12 (2007), 1-17.

Disadvantages of the NSR

Only open during certain seasons: Even though icebreakers in the region operate from the Yamal peninsula, transit passages through the entire NSR can currently only be conducted from mid-summer to late September.

Irregular glacial movements: Unpredictable glacial movements in the region can be the reason of extensions of the voyage duration. In addition, vessels trapped between glaciers may lose their manoeuvrability and require icebreaker asistance or, the worst-case scenario, may even run aground.

Sea ice and freezing temperatures: Temperatures in the Arctic region in August are below the average temperatures on the east coast of Russia and increase towards the west. Cold weather and sea water temperature may cause structural damages in ships. Freezing of fresh water and ballast tanks, difficulties in transferring fuel from bottom fuel tanks, as well as negative impacts on deck circuits can be given as examples. At the same time, cold weather will not be beneficial for maintenance and ongoing operations of the vessel and will affect the respective ship's crew in a negative way.

Lack of maps and infrastructure: Water depths in the region may vary due to glacial movements, and instruments measuring the water depth may give false readings due to glacial layers. Furthermore, polar regions are outside of the normal coverage area of many satellite providers.

Building costs of ice class vessels: Ice class ships have a higher construction cost than non-ice class ships. Actual amounts may vary depending on the type and quality of equipment to be used and placed on the ship.[9]

Lack of ship crews' ice navigation experience: For obvious reasons, the vast majority of merchant vessels sail in waters without glaciers or the presence of sea ice. Many captains are therefore only in theory able to navigate in such extreme conditions.

Distance to large maritime hubs: The population density in areas adjacent to the NSR is not sufficient to create large maritime hubs. These are not only needed for port calls, but also for the supply of provisions, bunkers, spare parts or crew changes which sometimes have to be conducted on very short notice. Even a single critical part of the ship's engine malfunctioning could lead to significant operational delays, and the lack of spare parts could further exacerbate this problem.

[9] Tomi Solakivi, Tuomas Kiiski, Lauri Ojala, "On the cost of ice: estimating the premium of Ice Class container vessels", Maritime Economics & Logistics, Vol. 21 (2017), 207-222.

Irreversible effects of marine pollution: The Arctic and Antarctica are rare places in the world which human beings can only pollute to a very limited extent directly. However, scientific research has shown that microplastic can even be found in Arctic glaciers[10]. Any kind of pollution that may be caused by possible collisions, groundings or other accidents will have more impact than in other regions. Given that the Arctic region is also the 'cooler' of the northern hemisphere, it may not be possible to reverse subsequent changes to the climate.

Overall environmental impacts: Due to the increasing amount of ship traffic, CO2 emission in the region are likely to increase which has a significant impact on the delicate environment in the polar region.

3. Passage regime of the NSR

The majority of the NSR passes through Russian territorial waters. Before any transits, which take place under the control of the Northern Sea Route Administration, vessel operators can apply to this agency directly or through shipping agencies.[11]
Documents and certificates required for any transit are the same as those required when merchant vessels navigate through other straits and channels around the world. Pilotage services are useful for ship masters who do not have experience in Arctic waters and to enhance environmental safety for ships transiting through the NSR alone or in a convoy accompanied by icebreakers.

In the coming years, the glaciers in the region are forecast to retreat even further due to the effects of global warming. Conditions for shipping operations during the summer months may therefore improve and transits further to the north – and outside of Russian territorial waters – could become feasible. Some researchers even predict that the transpolar sea route will be usable for ship transits through the region during the summer around the year 2050.[12]

Before the transpolar route becomes a feasible option for ship passages, however, the NSR is likely to gain more relevance. This may lead to legal disputes between Russia – as coastal state – and other countries. These disputes, which have already emerged and may become more prominent issues in the coming years, are largely due to different interpretations of concepts such as 'innocent passage' or 'transit passage', based on the United Nations Convention on the Law of the Sea (UNCLOS). In addition to UNCLOS, the International Maritime Organization has also adopted the mandatory Polar Code which 'covers the full range of design, construction, equipment, operational, training, search and rescue and

[10] Catherine L. Waller et al., "Microplastics in the Antarctic marine system: An emerging area of research", Science of the Total Environment, Vol. 598 (2017), 220-227.
[11] Detailed information and rules about transits can be found on the website of the Northern Sea Route Administration, available at: http://www.nsra.ru/en/home.html.
[12] Mia Bennett, "In just 20 years, ships could cross an open Arctic ocean", *Maritime Executive*, 9 June 2020, https://www.maritime-executive.com/editorials/in-just-20-years-ships-could-cross-an-open-arctic-ocean.

environmental protection matters relevant to ships operating in the inhospitable waters surrounding the two poles'[13]. The Polar Code is less controversial, but it has important implications for shipping operations in the Arctic region in general.

4. Summary

The melting of the Arctic glaciers in the polar region where the NSR is located is set to continue in the coming years, due to the impacts of climate change. The extent of the Arctic sea ice averaged for September 2020 was merely 3.92 million square kilometers, the second-lowest extent in the past 42 years. Arctic glaciers are expected to disappear entirely during the summer months around the year 2050 if the current temperature increase remains at its current peace or accelerates even further. This is likely to further increase the ship traffic in the region. The NSR, which connects Asia and northern Europe and offers the advantage of much shorter transit times compared with traditional shipping routes, is therefore very likely to be used more often.

Opening the NSR has some advantages and some disadvantages. The advantages can be summarized as follows:

- the NSR is shorter than traditional shipping routes for routes between large parts of Europe and Asia;
- the NSR offers significant time and cost savings;
- there are currently no security threats which are comparable to the route through the Suez Canal;
- overall CO2 emissions can be reduced significantly.

On the other hand, the disadvantages can be summarized as follows:

- the NSR is only navigable during certain times of the year;
- glacial movements are irregular, affecting the safety of navigation;
- sea ice and freezing temperatures can impact merchant ships;
- maps and relevant infrastructure are currently limited;
- construction costs of ice class vessels are significantly higher than for regular merchant ships;
- many masters and crews do not have relevant experience for operations under the specific conditions in the Arctic region;
- the distance to supply points and maritime hubs is significant;

[13] International Maritime Organization, “Shipping in polar waters”, accessed 2 January 2021, https://www.imo.org/en/MediaCentre/HotTopics/Pages/polar-default.aspx.

- possible marine pollution could have irreversible effects for the environment in the polar region and environmental impacts of shipping operations in general are more detrimental than in most other areas around the globe.

The majority of the NSR route passes through Russian territorial waters. Russia has therefore made some claims, trying to regulate ship transits while also enhancing its own sovereignty. In the event that global warming progresses as predicted by scientists and Arctic glaciers will indeed melt, conditions during the summer months may become suitable for passages further north, outside of Russian territorial waters. In the meantime, discussions related to UNCLOS provisions are likely to continue and further increase as maritime traffic increases on the NSR.

PANEL-II
(ONGOING AND/OR POTENTIAL IMPACTS OF THE COVID-19 PANDEMIC ON MARITIME SECURITY CHALLENGES)

INTRODUCTION

During the Maritime Security Conference-2020, the second session was a comprehensive look at maritime security challenges during the COVID-19 pandemic from a global perspective. While it was virtually impossible to identify all potential implications of COVID-19 in the midst of the pandemic, the discussions highlighted the range of challenges which had not been expected to occur just a few months earlier. The following five articles are a compelling summary of the impacts ultimately caused by COVID-19 on different levels.

The first article looks at space-based support for maritime situational awareness and identified specific operational impacts for navies. It is followed by a comprehensive look at the prevention of WMD proliferation in the maritime environment, both in general and during the ongoing pandemic. Specific maritime security challenges are then highlighted in the next article, underlining that different regions require different solutions, based on a comparison between NATO and the African Union. This is followed by a detailed study of the protection of crews and how naval forces can maintain their level of readiness for operations. The final article in this section then looks at the future of maritime intelligence, surveillance and reconnaissance (ISR) as well as the potential impact of COVID-19 on related capabilities.

Space-based Global Maritime Awareness is about to Come of Age

Prof.Dr.Guy Thomas

Space-based Global Maritime Awareness (GMA) is finally, after nineteen years, on the edge of coming of age. All efforts of the past nineteen years to bring GMA into the world as a useful entity are showing signs of bearing fruit at last. The unique capabilities provided by the new Radio Frequency Geolocation satellites to GMA are quickly going from concept to early maturity. This capability may well be the tipping point for GMA.

GMA was conceived in 2001 as a means to cmbat maritime terrorism and came into being with the launch of the first S-AIS constellation by ORBCOMM in 2008. However, it was not complete as a system until the recent launch of the first unclassified radio frequency (RF) satellites in the last eighteen months. HawkEye 360's Pathfinder was the first RF geolocation satellite, quickly followed by UnseenLabs's BRO-1. Both systems have now completed a year in space, living up to all expectations.

The term describing the new satellites is a bit cumbersome. Some owners and builders of these new satellites are uncomfortable with the label unclassified electronic intelligence (ELINT), even though Soviet ELINT satellites have been discussed and described in many open sources starting in the early 1980s. This is precisely what these first RF geolocation satellites bring to mind.

The intelligence community in particular is uncomfortable with the description unclassified electronic intelligence. Members of this community will probably be even more uncomfortable with Amber, the new satellite being built by Horizon Technology. According to the company, it will have the capability to collect and exploit unencrypted communications as well as radars and other emitters, thus adding an unclassified communications intelligence (COMINT) capability to the space world in the near future.
The combination of ELINT and COMINT provides a true signals intelligence (SIGINT) capability in space that can be shared across the globe for the first time ever. This is very different from the situation in 2004 when intelligence organizations in the United States and Canada tried and failed to get satellite AIS (S-AIS) declared a classified SIGINT system while ORBCOMM was building the first S-AIS constellation. Eventually, S-AIS was declared to be an unclassified "Aid to Navigation" and an unclassified global maritime situational awareness tool as originally intended. Based on this experience, however, the new satellites could be described as radio frequency geolocation satellites, "RFgeoSats" for short, or maybe "RFGSats", even though this title remains a bit cumbersome.

It has been recognized for some years that RF geolocation would be a useful tool for maritime situational awareness, especially when used in collaboration with S-AIS and synthetic aperture radars satellites (SARSats). The RFgeoSats fill a need to track ships when they turn off their AIS, as many bad actors do when they commence nefarious actions such

as smuggling or illegal fishing. It is also true for crews on ships avoiding sanctions. However, AIS and S-AIS can still be used to identify ships on initial contact before these systems are turned off. These two systems, S-AIS and RFgeoSats, are therefore complementary.

S-AIS provides the skeleton on which to build GMA, not merely space-based GMA. It is indeed the foundation of GMA as it provides locational information for all ships engaged in international commerce and many more who have installed AIS as a safety device. It does not only provide the location of a ship, but also name, physical dimensions, last port of call, next port of call, and much more information. AIS, both terrestrial and space-based, is therefore the sturdy skeleton of Global Maritime Awareness So far, however, this skeleton was lacking muscles to move it forward. The RFgeoSats's capabilities to locate and identify maritime emitters adds this capability.

All new systems routinely need refinement and the RFgeoSats are no different as they are just commencing operations. It is natural to believe the initial systems will need upgrades to both their processing and reporting abilities. One ability which will need special attention is the 'Specific Emitter Identification'. By 'fingerprinting' radar emissions, it is possible to determine a specific emitter by name or geolocation. Several companies which are currently building and operating RFgeoSats either have, or are working on, this capability and it is very likely that the RFgeoSats will soon be able to determine which specific ship is broadcasting a particular radar or communications signal by its unique signal parameters.
It is not enough, however, to simply develop the skeleton and the muscles. The brain has to function and evolve as well. It needs more and more data and information to allow for direction and purpose. Dynamic data processing provides the ability to convert the vast amount of data collected with various systems into actual information. Further processing creates understanding and, hopefully, develops wisdom which becomes maritime awareness and thus the baseline for better maritime security.

Synthetic aperture radar satellites (SARsats), with their day/night capabilities, are the eyes of the GMA system. Early versions were large. MDA's RadarSat 2, for example, was launched in 2007, measuring about 15 meters. ICEYE, one of the newest SARsats which is almost as capable as the previous generation systems, is less than a quarter of that size. Its prototype was even tested by flying it in the front passenger seat of a Cessna 172, a small single-engine airplane. SARsats and S-AIS are both good and useful systems by themselves, but the sum is much more than the individual parts. RFgeoSats will probably join this duo and further improve space-based GMA by a significant factor.

The patterns of life or operations at sea, gleaned from the collection of S-AIS for the past years, will soon be much easier to analyse due to RFgeoSats, further assisted by the SARs which can then be programmed to focus their collection efforts. By comparing the data collected with all three systems, analysts can develop a great deal of information including

who is trying to avoid detection. These three systems complement each other when used in collaboration for maritime awareness. The geographic area and the history of a vessel trying to avoid detection can tell analysts, now often assisted by artificial intelligence and machine learning, a great deal. Once the analysts have a handle on the task at hand, they can then call for the final collection effort, the imaging satellites.

The optical satellite systems, still and video, are also part of the visual system of GMA. The real-life analogy is simple: when a child grows up, it begins to understand what happens in the world around him or her. In the maritime world, optical satellite systems are especially useful to look at specific objects and events which are of interest to analyst. Photos and videos can tell the analysts a great deal, but they need to take a look in daylight to really get the high-resolution pictures which are most useful.

While optical satellite systems can be used to search in known areas of maritime operations, they are most productive when they are aimed at a specific location for a specific purpose. The analysis to provide that location and purpose comes from the other three systems, S-AIS, RFgeoSats and SARsats, as described above.

Another type of unclassified satellite system which has been used so far for other purposes has recently started being pioneered by Global Fishing Watch to provide yet another data source for global maritime awareness. It is called Visible Infrared Imaging Radiometer Suite (VIIRS). This system is limited to night-time and fair weather as it detects ships illuminated at night. As many fishing vessels operate at night, it is especially useful for detecting of illegal, unreported and unregulated (IUU) fishing, a major problem in many regions around the globe. VIIRS is very similar to SAR in its widest mode. Its large swath capacity provides no detailed discrimination, but even a single pixel of light indicates the presence of at least one ship.

Even better, the data is free as the sensor is on both NOAA weather satellites as well as a NASA research satellite which cover the entire world several times a day. All in all, it is proving to be another useful complement to S-AIS as well as SAR. It is at least possible that the RF geolocation satellites data will also be added to this mix very soon, helping to identify at least the type of activity.

Global Maritime Awareness now has a great deal of information available s from multiple sources including the IMO's Long Range Identification and Tracking (LRIT) system as well as the Vessel Monitoring Systems (VMS) of the world’s fishing fleets, as well as shipping records, police and other law enforcement records, information provided by ship builders, brokers and financial institutions. It is an eclectic collection, but nearly all of it is useful at one time or another.

The dynamic data analysis (DDA) system supporting GMA is dual purpose. It both collects and stores the data. More and more data and information on maritime operations both at sea and in the marine support system on land has been collected in the recent past. The GMA system therefore contains different DDA tools, developed by various entities all over the world. One common denominator is the attempt to routinely incorporate machine learning and artificial intelligence. DDA tools have been developed by many of the companies which are also building remote sensing satellites. At the same time, there are also stand-alone DDA efforts available. In general, these tools have come a long way from the first such systems which were released between 2004 and 2006.

The satellite revolution now underway will enable significantly improved tactical ISR collection over the maritime domain. However, analytical insight at the speed of relevance is still the holy grail. Windward, a Tel-Aviv based maritime analytics company, took DDA to a whole new level by being the first to fully introduce artificial intelligence to exploit maritime data in innovative ways. The company provides insights to many organizations in the maritime environment, including governments, insurers, financial institutions and energy companies, enabling them to optimize their performance and stay ahead of the bad actors that some of the Windward clients are hunting.

The way ahead

Global Maritime Awareness is currently on the edge of fulfilling the promise that it was based on almost two decades ago. Indeed, the world space community keeps upgrading the GMA system with more satellites and improved capabilities. The "skeleton" is now well-defined, with several companies competing with each other to build better and better S-AIS-based databases and support feeds. At the same time, the eyes are getting better and better as various organizations in the private sector are developing the respective capabilities. In turn, the respective technical features are becoming more and more useful to various stakeholders in the maritime domain.

The "muscles", as described above, will also continue to improve in the coming years. The RFgeoSat system, which is basically unknown in many parts of the world today, is very likely to have a major role in the GMA system in the near future. Incidentally, this is exactly what happened with S-AIS. In the space of just two years, between 2008 and 2010, S-AIS went from unknown to must have. The full utility of RFgeoSats has only just begun to be explored. If history is a guide, the possibilities are exceptional, the only real limitation is the imagination of the developers.

Regarding RFGeoSats, one of the first things that needs to be done is the development of an Electronic Support Library (ESL) which contains the parameters of every shipborne emitter. This is a huge task, but it is possible, particularly given the big data collection and analysis capabilities which are now available and likely to become even better in the coming years.

There are now multiple entities collecting and processing S-AIS and AIS historical data going back to at least 2002, two years before AIS became mandatory. Big data has continued to expand rapidly in the last 20 years and the ability to store, access and analyze large amounts of data will continue to improve. The parameters of an emitter are a finite set that can be stored in a database with a set number of fields. Overall, this task is therefore much less daunting than it would seem at first glance

Preventing the proliferation of Weapons of Mass Destruction (WMD) in the maritime domain

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NATO will continue to add value to non-proliferation efforts by fostering the development of Allied capabilities to impede or stop the trafficking of WMD, related materials and their means of delivery. For instance, these capabilities could be employed in maritime operations (…).

NATO's Comprehensive, Strategic-Level Policy for Preventing the Proliferation of Weapons of Mass Destruction (WMD) and Defending against Chemical, Biological, Radiological and Nuclear (CBRN) Threats.

The world's oceans are increasingly important for the international economy. Approximately 85 per cent of all international trade is transported by sea with tankers carrying more than half of the global supply of petroleum. The maritime domain is of vital strategic importance to NATO and hence the alliance is determined to help protect its allies from maritime threats.

With the increasing use of the sea as a method of transportation, there is an increased likelihood that both state and non-state actors could proliferate weapons of mass destruction (WMD)[1] in this environment. Consequently, NATO is increasingly focussed on preventing WMD proliferation in the maritime domain. NATO's 2011 Lisbon Summit Declaration specifically highlighted that 'Operation Active Endeavour (OAE), our Article 5 maritime operation in the Mediterranean, is making a significant contribution to the fight against terrorism.'[2] In 2016, OAE was transitioned to a non-Article 5 maritime security operation (Operation Sea Guardian) that performs a wider range of maritime security tasks.

Present and future security challenges require NATO to be prepared to protect and defend against a full spectrum of threats. In particular, *NATO's Comprehensive, Strategic-Level Policy for Preventing the Proliferation of WMD and Defending against Chemical,*

[1] NATO defines weapons of mass destruction as 'a weapon that is able to cause widespread devastation and loss of life'.
[2] Lisbon Summit Declaration, issued by the Heads of State and Government participating in the meeting of the North Atlantic Council in Lisbon 2011, https://www.nato.int/cps/en/natolive/official_texts_68828.htm.

Biological, Radiological and Nuclear Threats, endorsed at the 2009 Strasbourg/Kehl Summit, noted that 'the spread of WMD and the possibility that terrorists will acquire WMD, as the principal threats to the Alliance over the next 10-15 years'.[3] NATO stated that it would enhance non-proliferation efforts by fostering the development of allied capabilities to impede or stop the trafficking of WMD, related substances and their means of delivery. These capabilities should also be employed to stem the trafficking of these materials at sea.

The 2010 Alliance Maritime Strategy assessed the world's oceans and seas as an increasingly accessible environment for terrorist activities, including the transport and deployment of weapons of mass destruction and associated materials. Furthermore, this strategy specifies that the alliance will 'maintain the ability of NATO's maritime forces to undertake the full range of maritime interdiction missions, including (…) preventing the transport and deployment of WMD.'[4]

At the 2010 Lisbon Summit, NATO heads of state and government expressed their concerns about the proliferation of WMDs, and their intention to continue to implement *NATO's Comprehensive, Strategic-Level Policy for Preventing the Proliferation of WMD and Defending against CBRN Threats*. The North Atlantic Council (NAC) was tasked to assess and report on how NATO can better counter the proliferation of WMD and their means of delivery. The report[5] encourages NATO members to attend relevant training activities in maritime interdiction operations (MIO)[6] and to consider subsidisation of partners' attendance, especially prior to deployment on operations, thus enhancing their capabilities for identifying, tracking and reporting WMD materials. Additionally, NATO members were encouraged to explore WMD challenges in the maritime environment and possibilities to improve maritime situational awareness in other regions.

At the 2016 Warsaw Summit, NATO's heads of state and government participating in the meeting of the North Atlantic Council highlighted NATO's maritime posture which 'supports the four roles consisting of collective defence and deterrence, crisis management, cooperative security, and maritime security, and thus also contributes to projecting

[3] C-M(2009)0048(INV) - NATO's Comprehensive, Strategic-Level Policy for Preventing the Proliferation of Weapons of Mass Destruction and Defending against Chemical, Biological, Radiological and Nuclear Threats, 31 March 2009.

[4] Alliance Maritime Strategy, 18 March 2011, https://www.nato.int/cps/en/natohq/official_texts_75615.htm#:~:text=The%20Alliance%20Maritime%20Strategy%20identifies,and%20cooperation%3B%20and%20maritime%20security.

[5] C-M(2011)0041 – Lisbon Tasking to Assess and Report on how NATO Can Better Counter the Proliferation of Weapons of Mass Destruction and their Means of Delivery, 7 June 2011.

[6] NATO defines a maritime interdiction operation (MIO) as 'an operation conducted to enforce prohibition on the maritime movement of specified persons or materials within a defined geographic area. MIOs are normally restricted to the interception and, if necessary, boarding of vessels to verify, redirect or impound their cargoes in support of the enforcement of economic or military sanctions.'

stability'[7]. Consequently, the operationalisation of the *Alliance Maritime Strategy*, as well as the future of NATO's maritime operations, have to be further developed.

In addition, NATO reaffirmed in 2017 that 'the capability to conduct maritime interdiction operations (MIO) for the prevention of WMD proliferation is an important element of NATO's approach to preventing the proliferation of WMD and defending against CBRN threats'.[8] NATO's policies do not necessarily lead to actionable direction and guidance. NATO's military authorities should therefore translate these policies into military concepts and doctrines.[9]

MC 0588 - Military Committee Concept for NATO Maritime Security Operations defines maritime security and 'underlines its importance to Allies' overall security and stability. It responds to the wide range of current and predicted threats to security interests in the maritime environment.'[10] This concept also describes MSO tasks. Two of them are related to preventing the proliferation of WMD: 'Maritime Interdiction' and 'Fight the Proliferation of WMD'. Maritime interdiction requires forces assigned for quick response actions to be capable of undertaking the full range of interdiction missions. Maritime interdiction may involve various capabilities, including the use of special operations forces and CBRN defence specialists to board suspect vessels. MC 0588 explains the task of fighting the proliferation of WMD in more detail. To prevent transport and deployment of WMD, the interdiction force will require on-board basic detection and identification capabilities.

MC 0603/1 – NATO Comprehensive CBRN Defence Concept supports maritime interdiction operations explicitly. 'CBRN defence supports interdiction operations aimed at preventing the theft or illicit trafficking of CBRN materials by land, air and maritime interdiction to take action against a pending CBRN threat'.[11] Appropriate CBRN defence measures support the targeting process for the interdiction of illicitly trafficked CBRN substances, CBRN offensive research, production and storage facilities, transport assets and launch sites. *MC 0635 – WMD Disablement Functional Concept* assumes that 'NATO will foster

[7] Warsaw Summit Communiqué issued by the Heads of State and Government participating in the meeting of the North Atlantic Council in Warsaw/Poland 2016, https://www.nato.int/cps/en/natohq/official_texts_133169.htm.

[8] C-M(2017)0028 – Implementation Report and Recommendations on NATO'S Comprehensive, Strategic-Level Policy for Preventing the Proliferation of WMD and Defending against CBRN Threats, 26 June 2017.

[9] A 'concept' is considered as 'an agreed notion or idea, normally set out in a document, that provides guidance for different working domains and which may lead to the development of a policy', whist 'doctrine' is defined as 'fundamental principles by which the military forces guide their actions in support of objectives. It is authoritative but requires judgement in application.' In other words, a concept describes *what* to do whilst a doctrine describes *how* to do it.

[10] MC 0588 – Military Committee Concept for NATO Maritime Security Operations, 21 April 2011. Maritime Security is defined as 'the ongoing condition in the maritime environment where international and national laws are adhered to, the right of navigation is preserved, and citizens, vessels, infrastructure, and resources are safe.'

[11] MC 0603/1 – NATO Comprehensive Chemical, Biological, Radiological, Nuclear (CBRN) Defence Concept, 26 May 2014.

the development of Allied capabilities to locate, characterize, secure, eliminate or dispose WMD, related materials and their means of delivery, either in land, maritime and air routes, including the ability to conduct WMD Disablement missions.'[12]

Allied Joint Publication AJP-3.1(A) – Allied Joint Doctrine for Maritime Operations outlines the basic principles, doctrine, and practices of NATO's maritime forces in a joint environment. It intends to influence thinking and provide guidance to NATO joint and maritime commanders as well as to their staffs about the application of maritime power. AJP-3.1 reflects MC 0588 but also emphasises the importance of CBRN Reachback to support commanders' assessment of a WMD/CBRN/related situation in the early stages.[13]

Allied Tactical Publication ATP-71(A) prepares forces on NATO warships to conduct MIO on short notice.[14] In support of this objective, guidance provided herein is applicable to all commands that may be involved in the planning or execution of a MIO. The information contained within ATP-71 should be useful to personnel of other armed services and branches who are also tasked to support MIO, such as special operations forces and CBRN defence specialists. This tactical publication applies to all commanders of a vessel. All vessels may be tasked to participate in MIOs where intelligence suggests that CBRN weapons, substances and components may be found. ATP-71(A) provides very detailed guidance for the respective tactical commander on CBRN defence, such as considerations on a CBRN defence team concept, command relationships and responsibilities, CBRN defence team equipment, CBRN MIO search procedures, as well as on phases of a CBRN MIO search.

This brief essay would not be complete without mentioning the Maritime Security Centre of Excellence (MARSEC COE) in Istanbul/Turkey, and the NATO Maritime Interdiction Operational Training Centre (NMIOTC) in Chania/Greece. Both centres contribute to NATO's transformation and they are actively training military and civilian personnel for NATO and its partners.

In 2020, the Covid-19 crisis highlighted that NATO must be capable to perform MSO even under certain conditions, for example under force health protection measures during the pandemic. JCBRND COE is currently drafting a report addressing the NATO Command Structure as well as other relevant bodies, such as NATO's Committee on Proliferation (defence format) and Joint CBRN Defence Capability Development Group (JCBRND-CDG), among others focussing on military capabilities within the biological defence domain. The recommendations should have wide influence (e.g. policy and concepts, defence planning, and operations planning).

[12] MC 0635 – Weapons of Mass Destruction Disablement Functional Concept, 17 March 2017.
[13] AJP-3.1(A) – Allied Joint Doctrine for Maritime Operations, 16 December 2016.
[14] ATP-71(A) – Allied Maritime Interdiction Operations, 20 September 2013.

Should the maritime community of interest decide to develop additional Allied Joint Publications, such as an Allied Doctrine for Maritime Security Operations (MSO), or Allied Tactical Publications beyond ATP-71, the JCBRND COE stands ready to support within the frame of available capacities.

Maritime Strategies of the North Atlantic Treaty Organisation and the African Union: Similarities and Challenges

Dr. Marten Meijer

1. Introduction

This paper[1] presents the maritime strategies of the North Atlantic Treaty Organisation (NATO) and the African Union (AU). It also describes some similarities between these strategies and concludes with the challenges that both NATO and the AU are facing to implement their strategies and to protect and to exploit all opportunities related to the sustainable development of the 'blue economy', both around the Atlantic Ocean and the Indian Ocean. Key in the development of a sustainable maritime strategy is the principle of granularity, which dictates that seize should follow purpose. This paper concludes with some challenges from this principle of granularity for the maritime strategies of the North Atlantic Treaty Organisation and the African Union and subsequent entities.

2. Background: North Atlantic Treaty Organsation and the African Union

NATO consists of 30 nations in Europe and North America. It is based on solidarity and cohesion and has a maritime strategy, consisting of three pillars: crisis management, collective defense and cooperative security. The NATO Maritime Strategy, agreed in 2011, clearly identifies the parameters for NATO's maritime activities. Maritime forces increasingly contribute to deterrence and defence and projecting stability through three primary functions: strategic, security and warfighting. NATO is reinforcing its maritime posture with a focus on these three functions and is taking concrete steps to improve NATO's overall maritime situational awareness. NATO has Standing Naval Forces – NATO's highly trained maritime, immediate-response capacity. NATO's maritime and joint exercise programme is key to interoperability and improving core warfighting competencies. NATO is currently leading Operation Sea Guardian in the Mediterranean and is providing assistance to help deal with the refugee and migrant crisis in the Aegean Sea.

The AU consists of all 55 nations on the African continent. It is guided by its vision of an integrated, prosperous and peaceful Africa, driven by its own citizens and representing a dynamic force in the global arena. The AU created an African Standby Force[2] and is developing its maritime strategy, which draws attention to a broad array of real and potential threats that could result in mass casualties and inflict catastrophic economic harm to African States. In addition to loss of revenue, they could fuel violence and insecurity. Some of them, such as drug trafficking, could feed corruption, finance the purchase of illegal weapons,

[1] Commander Dr. Marten Meijer of the Royal Netherlands Navy has been a maritime planner at the NATO headquarters in Naples, Italy from September 2017 thru April 2020. He wrote this article on a personal title in connection with his NATO work for the African Union in 2017. His observations, conclusions and recommendations do not necessarily correspond with the NATO policy or the policy of the Dutch government

[2] In 2005, NATO began to provide advice on the African Standby Force based on experiences with the NATO Response Force through a team of four NATO officers at the AU headquarters in Addis Ababa.

corrupt the youth, pervert democracy/rule of law, distort economies and destabilize communal life. As the actors threatening Africa's maritime domain continue to grow in number and capability, there must be a corresponding African endeavor to address these at the national, regional and continental levels.

By and large, the African Union is more of a political organisation while NATO is more of a military organisation. The AU is in the process of approving their maritime strategy. The current NATO maritime strategy has been agreed upon in 2011 by the 30 NATO member but is now under revision. The AU has only a few naval ships, most of them old or small or both. NATO nations have many naval ships, many of those are relatively large and new. The key message is that the AU maritime strategy needs more focus, more ships and more standardization in its decision-making. Among other things, this need for more standardized decision-making originates from very sad statistics about the sheer number of Africans drowning in the Mediterranean.

The numbers of casualties exceed by far the number of casualties that evoked unrest in the United States and Europe under the banner of 'Black Lives Matter'. In this context, the question why nobody cares about African people drowning at sea is pertinent. These victims of human trafficking, an internationally organized crime that should be countered by both the African Union and NATO, need more attention in the maritime strategies of both organizations. Features and backgrounds of human trafficking are typically well hidden, as most of the attention focuses on the victims of these crimes, not the perpetrators. Libya in particular is a hotspot and breeding ground for human trafficking of Africans from across the continent.

3. The fight against terrorism in Libya and against human trafficking

Speaking of Libya is rather sensitive in NATO as the NATO operation Unified Protector in 2011 destroyed much of the security infrastructure in Libya, which nowadays complicates the fight against human trafficking. In early 2017, Amnesty International published a report on the victims of human trafficking, drowning in the Mediterranean. In November 2017, the US-based news network CNN broadcast a documentary on the trade in human beings in Libyan migrant camps and the mass graves on Libyan beaches, covering the bodies of victims of human traffickers, who drowned in Libyan coastal waters.

Looking back in time, it is clear that a lack of comprehensiveness in military operations caused a wide array of long-term problems. At the beginning of 2011, an international alliance of countries headed by the United States conducted air strikes on Libya in the framework of the American operation Odyssey Dawn[3]. In March 2011, NATO – after much hesitation from Turkey – decided to carry out the operation Unified Protector, which included bombarding targets in Libya from the air and from the sea. In October 2011, Colonel Muammar Gaddafi, the head of state of Libya and co- founder of the African Union, was then murdered by Libyan rebel fighters.

[3] The Security Council of the United Nations decided in resolution 1970 to introduce a flight ban over Libya to prevent the Libyan government from dropping the civil war. Two UN resolutions on assistance to the civilian population and an arms embargo followed later.

More than ten years later, the situation in Libya seems to have improved very little. There is still plenty of room for terrorist groups to operate. Smugglers send thousands of Africans in unseaworthy boats on trips across the Mediterranean, resulting in many of the migrants drowning en route to Europe.

In recent years, there has been a lot of progress in the interception of ships operated by groups involved in smuggling and human trafficking, particularly in Libyan coastal waters. The Italian Navy received permission from Libyan authorities to operate in Libyan territorial waters. Italy also provided several coastguard ships, and coastguard personnel were trained by naval units, including those that deployed in the EU-led operation Sophia.

NATO is currently deploying a number of naval units under the flag of the NATO operation Sea Guardian. This operation, however, concentrates mainly on the eastern part of the Mediterranean around Greece and Turkey. The Italian Navy as well as the European Union and NATO are mainly using larger naval vessels. At the same time, human traffickers primarily exploit a multitude of small vessels via so-called 'swarming', i.e. deploying a swarm of such small vessels, which means that at least some of these vessels are usually able to escape interception. Effectively combating this form of organized crime requires the deployment of, in particular, many small ships. Size follows purpose, the principle of granularity and proportionality.

4. Challenges in granularity for the maritime strategies of NATO and the African Union

African states only have a limited number of naval or coastguard vessels as can be seen in various public sources, such as Jane's defence publications[4]. Somalia and Libya, for example, both have very long coastlines but are unable to protect them with their own navies or coastguards. Illegal activities, ranging from piracy and illegal fishing to arms smuggling and human trafficking, therefore often remain unseen and unpunished. Below are therefore some recommendations which could help these and other countries to protect their coastal waters in the future.

One similarity between NATO and the AU is that both organizations are based on collective defense, cooperation and cohesion. Both are also constantly developing their respective maritime strategies. Striking differences originate from the fact that NATO has standing naval forces at sea, which are also engaged in NATO maritime operations, controlled in various NATO headquarters. While the AU has a military standby force, it does neither have standing naval forces at sea, nor maritime operations under the control of the AU headquarters. Therefore, it is recommended to develop AU maritime capabilities, control them in maritime coordination centres and deploy them in AU maritime operations.

Now that European support for the fight against terrorism in Somalia has been reduced significantly and Somali forces may not yet be able to continue this fight effectively, it must be concluded that NATO can play a role in training and equipment Somali forces and a Somali coastguard. In September 2017, Turkey opened a large military academy in Somalia to better train Somalian officers and NCOs. In November 2017, the United States provided

[4] See Commodore Stephen Saunders (2016): IHS Jane's Fighting Ships 2016-2017, https://cdn.ihs.com/www/pdf/JFS-Cover-TOC.pdf

drones for surveillance of the Somali borders to AMISOM in Somalia. They also increased the number of air attacks against the terrorist group Al Shabaab in Somalia at the end of 2017.

Overall, the two largest NATO countries already play an active role in Somalia. Therefore, it is recommended to flank the initiative of these countries with broader NATO support. With regard to the defense of Somalian coastal waters, one can think of setting up, equipping and training a Somali coastguard based on an American or Dutch model. In the fight against drug smuggling in the Caribbean, these countries have discovered in recent years that small and fast ships used by smugglers can best be fought with small ships operated by the coastguard.

One example is the US Sentinel class, a coastguard mother ship that launches small high-speed ships from her stern. This concept has also been successfully applied on the Dutch naval vessel HNLMS Rotterdam. It has proven to be very effective in countering drugs trafficking, both by the high speed of the smaller vessels that can be launched and the relatively small size of the mother ship, which makes her less visible from a distance and gives the advantage of a sudden arrival. It is recommended to use this type of vessel also for countering piracy, pollution of coastal waters and human trafficking, both by the African Union and NATO.

The key message of the principle of granularity is that small vessels, launched by ships like the Sentinel class, do not have the obligation to embark people as they lack the capacity to do so. They can only tow back other vessels. That type of intervention can be partiularly effective under certain circumstances, for example when it comes to human trafficking at sea. Effective early interventions are needed, as close as possible to the shore and preferably in territorial waters, where African states have full control of their own territory.

The US Coast Guard has already commissioned more than 30 ships of the Sentinel class. With adequate financial support from the international community, such vessels could also be deployed in NATO support for countries like Somalia and Libya. For example, the Somali Minister for Fisheries and Environmental Protection has informally requested such support. The upcoming assessment of the operational readiness of the Somali armed forces[5] could be used as a lever to formally ask for this support, especially if Somalia's maritime capabilities prove to be seriously inadequate.

For Libya there is a similar request for international support expected. In November 2017, a worldwide upheaval arose when new forms of human trafficking and slavery appeared to be occurring in Libyan camps for stranded victims of human smuggling. The African Union then carried out an evacuation plan to return these victims with chartered aircraft to their countries of origin. This transportation operation was strongly supported by a campaign in which the victims were interviewed by their national television companies. All victims declared never more to travel to Libya for the onward journey to Europe. These operations have thus not only immediately relieved human suffering, but possibly also prevented more victims of human smuggling.

[5] See United Nations Security Council Resolution 2372, https: //www.un.org/press/en/2017/sc12972.doc.htm

When and where possible, NATO should support Somalia and Libya. It is also advisable to consult the AU, because many other African countries have to cooperate to counter irregular migration and human trafficking from Africa towards Europe. Prior to NATO operations in Libya in 2011, the AU was not consulted by NATO. That omission still looks like a political mistake and a missed opportunity. Bilateral contacts between the NATO Secretary General and Libyan leaders in June and September 2017 may suffer from the same criticism from the African Union. Both in Africa and in Europe, however, too many lives have already been lost to make this mistake for the second time.

5. The principle of granularity for organizational challenges in NATO and the AU

Based on the observations described above, it is also recommended to the African Union to secure African borders better, especially those of African coastal states. Landlocked African countries might have less appetite to join an Indian Ocean Treaty Organisation (IOTO) or South Atlantic Treaty Organisation (SATO), which both have to be based on collective defence. In the Mediterranean, a Mediterranean Treaty Organisation (METO) could help to orchestrate the fight against human trafficking. Needless to say that all these three organisations, IOTO, SATO and METO consist of countries which are close to those seas, so that the principle of granularity dictates small sizes, instead of a huge umbrella organization which will fail to meet the needs of all nations by definition. The strategy of small size and scale should counter inertia, which is typical for large-scale organizations and subsequent strategies. Lead nations for IOTO could be India, for SATO South Africa and Israel for METO.

Finally, NATO support for Libya should protect its borders, both on land and at sea by providing Sentinel class ship types to African navies and coastguards. Not only training, but also equipping these African organizations is key to operations against trafficking of humans, drugs or other cargoes and also to prevent pollution of African territorial waters. Safe and clean seas and oceans are of global human interest to exploit and protect the blue economy.

Improving readiness and protecting crews to maintain a reliable maritime security level in a pandemic environment

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This article provides an insight into specific concepts to maintain global maritime security, even during the Covid-19 pandemic, and looks at limitations after this unprecedented situation. This approach will identify the main features of the maritime security environment. The originality of this approach is the identification of opportunities and perspectives on maritime security. This will be achieved through a realistic approach of limitations that Covid-19 has shown for globalization and maritime security from the perspective of a concrete threat posed by the pandemic, which has created an unforeseen situation in many scenarios.

In this context, maritime security is to be analyzed starting from the hypothesis that the Covid-19 pandemic affects maritime security and safety, maritime trade, international relations, mutual trust, and citizens' freedom of movement. This starting point is helpful to analysts and politicians to exploit the balance of power after Covid-19. Some objectives have to be set to define the latest shapes of, for example, the Black Sea region particularities, the new international/regional identity, and the latest risks and threats for regionalization and maritime security. In this context, an evaluation of new components of maritime security provoked by the pandemic could lead to new regional political, military, economic and legal initiative which could bring new options and ways for different economic development in a Black Sea security environment[1].

At a time when the entire world is facing (maritime) security challenges due to Covid-19, the need for a high-level and deep strategic analysis is of the utmost importance. National maritime security strategies generally take into account elements of Mahan's naval power, Mackinder's geographical pivot and islands of the world, Spykman's theory of shores, or Cohen's new geostrategic distribution. Now is the time to forget about the classics and to re-evaluate maritime strategies under the limitations that occurred under the Covid-19 pandemic and the pressure of maintaining a high operational level.

[1] Rear Admiral (UH) Mihai Panait, *Opportunities and challenges regarding the regionalization of security at the Black Sea. perspectives concerning economic cooperation in the Black Sea and its impact on regional security,* Bulletin of "Carol I" National Defence University, 2/2020, https://revista.unap.ro/index.php/bulletin/article/view/882.

The geopolitical model promoted by Cohen most obviously explains contemporary geopolitical options by promoting a geopolitical structure of the international system (defined by shape, size, geographical, physical and human characteristics), as well as a network to connect them. Also, political-geographical nodes contribute to the unity and coherence of the geopolitical system. For Cohen, 'geopolitical systems behave like physical systems' and, as such, they evolve in a predictably structured way[2]. Ideally, after any disturbance, balance is restored only by self-correction. Overlapping the pandemic over this model shows that the networks that connect the elements of maritime security are radically affected, modifying them structurally in an unpredictable manner. However, the balance within maritime security cannot be easily corrected in an acceptable period of time. Bbreaches, limitations, and risks to maritime security therefore have to be identified. After we have determined the weaknesses of regional and global maritime security, it is necessary to clarify opportunities for the development of those areas that have not been exploited so far. These areas should mainly belong to national power instruments, such as military, intelligence, diplomatic, financial, informational, legal, and economic power.

In this context, the Romanian Naval Forces tried to maintain an acceptable level of readiness of all ships in the fleet. Under the present circumstances – which include monitoring, limiting and mitigating the pandemic – the DIME strategies and doctrines have to be re-explored, starting with a re-evaluation of how society has to be connected and linked again to a safe and secure economic collective life.

Are we optimistic regarding the new type of regionalization and maritime security in the Black Sea region after this pandemic? Is isolationism a new stage in our society, given the new security projection produced by Covid-19? Security analysts have to initiate planning instruments and put national power elements in a different light as they could affect maritime security, citizens' safety, cooperation in all domains, and globalization. The pandemic led to a dilution of almost a century of globalization in all domains. At this moment, it may be difficult to recognize the trauma that has affected maritime security, but it is already possible to distinguish further changes in the field of maritime security, diplomacy, and the economy.

This pandemic – and its social complications – will change maritime security and the safety of maritime trade in the Black Sea. Covid-19 has already changed the reference evaluation points of maritime risks and threats, of legislation regarding maritime economic and diplomatic aspects, the balance of regional power, and the freedom of movement and border control. In this context, the planning of maritime security emphasized that a SWOT type of evaluation can help to identify new opportunities and perspectives when weaknesses and threats appear in the diplomatic, military, and economic domains. Regarding legal aspects, human rights, rule of law or national states of emergency, this pandemic has taken virtually all decision-makers by surprise and found all nations and organizations unprepared.

[2] S. B. Cohen, *Geography and politics in a world divided*, Random House, Michigan, 1964, pp. 57-60.

Research programmes in the defence industry have been stopped. The money did not flow as planned and many research centers were closed. In this unprecedented situation, new packages of laws (financial, economic, budget planning) had to be planned and implemented immediately to keep budget balances at an acceptable level. These laws have had to adapt very quickly to unplanned government spending to limit a possible disaster caused by the pandemic.

Comprehensive legislation related to the reorganization of the transport of people and goods has been developed, under limitations caused by Covid-19. Nations have promoted a variety of laws and taken measures to limit exports of essential goods. The legislation in the field of trade (especially maritime trade) produced great effects in the GDP of many countries, but especially among those for which maritime transport and related activities are essential parts of the economy.

From my perspective, these evaluations are now the fundamental foundations of a new type of Black Sea regional cooperation that would lead to the validation of DIME instruments. Common values of the Black Sea region such as common history, democratic values, trust and cooperation, and geographical identity have to be strengthened around the safety of citizens. Nevertheless, the Black Sea is the most valuable common good which has to be protected by all stakeholders in the region. The development of comprehensive maritime security strategies through a regional vision will be an advantage for all riparian states, in all domains, without limiting individual expression, and in conditions of consensus. Efforts should focus on identifying and implementing several projects in a number of sectors that offer opportunities for economic development, based on stable regional security such as maritime trade, maritime environmental protection, renewable energy sources, natural disaster management (especially earthquakes), and migration and combating trafficking of human beings. Maritime trade is the most affected, so that economic problems are a common point of all countries bordering the Black Sea, which necessarily involves the participation of various stakeholders to reduce undesirable effects[3].

Having highlighted these particular aspects of the Black Sea region, it is also important to look at the current risks and threats to the regionalization of Black Sea security from the perspective of a disruptive factor such as a pandemic.

Global developments in border permeability, the dilution of globalization to the detriment of regionalization, the focus of each nation's efforts on saving its citizens and less those belonging to a region, organization, or military bloc, may have a non-linear, asymmetrical or even multi-faceted appearance. These issues will not be easy to assess and, implicitly, it will be difficult to identify tools to address them. At the moment, it is no longer possible to speak of unitary, global leadership carried out by multinational, regional, or global security

[3] Mihai Panait, Opportunities and challenges regarding the regionalization of security at the Black Sea, ibid.

organizations, with the emergence of much stronger national interests based only on the interests of the respective nation. The role of military or economic security organizations could be diluted for a period of time, if the interests of the states that do not claim to play the role of a regional power will not consider that it is in their interest to act together. Great powers or states and organizations that are considered to be regional powers will tend to promote the regionalization of security, so this initiative will support the effort to defend their military, economic and diplomatic interests, as well as their own citizen' security.[4]

Naval operations could be called into question under these pandemic conditions, when an 'unseen enemy' in the form of a virus has set out to break any rules, and endangers not only fighters and sailors, but also the entire population. The danger that this virus may pose materialized when some multinational maritime exercises where canceled. The decision to cancel these exercises was taken in cooperation with national/international health authorities to limit the spread of the virus within involved countries and the ships' crews.[5]

The participation of US troops in the Defender-Europe 20 exercise in Europe was canceled due to the outbreak of Covid-19, and the guidance of the Deputy Secretary of Defense, David L. Norquist[6], highlighted that 'the health, safety and operational capacity of military and civilian personnel, as well as their families is a major concern'[7]. The exercises connected to Defender-Europe 20, namely Dynamic Front, Joint Warfighting Assessment, Saber Strike, and Swift Response, did not take place.[8]

This pandemic forced governments to re-evaluate allocated budgets for defence according to new threats and risks posed by the Covid-19 situation. The rescheduling of naval exercises may lead to a change in the structure of defence budgets. However, the most dangerous aspect could be the decreasing amount of training time on ships or the participation of some countries in multinational exercises for a relatively long period of time. The lack of common training, in the conditions given by the presence of the virus, could lead to a decreasing readiness level, especially for sailors who are 'newcomers' and have not received much training on ships in their careers. The defence budget for the coming years has to be oriented

[4] Michael T. Klare, The Nation, *From Globalization to Regionalization? The world after the coronavirus pandemic is likely to be a very different place*, 22 March 2020, https://www.thenation.com/article/economy/globalization-regionalization-covid/.
[5] Norwegian Armed Forces, *The Norwegian Armed Forces end exercise Cold Response*, https://forsvaret.no/en/newsroom/cold-response-status.
[6] US Department of Defense, Immediate Release, *Statement by the Department of Defense on Domestic Travel Restrictions*, 13 March 2020, https://www.defense.gov/Newsroom/Releases/Release/Article/2112213/statement-by-the-department-of-defense-on-domestic-travel-restrictions/.
[7] U.S. Army Europe, *Defender-Europe 20*, https://www.eur.army.mil/DefenderEurope/.
[8] U.S. Army Europe, *Exercise Defender-Europe 20 UPDATE, 16 March 2020*, https://www.eur.army.mil/Newsroom/Releases-Advisories/Press-Release-and-Advisory-Archive/Article/2113178/exercise-defender-europe-20-update/.

towards new projects as well as new C4ISR technology and systems, helping to monitor – among other things –health concerns to improve fleet readiness.

New definitions and terms have appeared in the medical legislation to differentiate certain aspects regarding patients, the level of risk, and the criteria for establishing the risks of severe illness. Thus, new definitions of close contact, personnel with a high risk of spreading the virus, restrictions on freedom of movement, isolation, quarantine or new ways of screening have appeared. Commanding officers on naval ships must consider to implement an isolation bubble for ship and crew. Even contact with logistical support from the shore or with local civil and military authorities led to new challenges. Moreover, the maintenance of on-board equipment has become difficult given the prohibition of external personnel from entering the ship.

Of particular importance is the limitation to the maximum of physical training activities indoors or onboard ships. The ability to maintain a high level of physical exertion is more difficult to achieve when physical distancing and related measures must be maintained. Furthermore, regular physical evaluations of sailors must be postponed until they can be carried out under safe conditions. These assessments must be performed only under conditions approved by flag officers in accordance with medical authorities' legislation.

Training on ships has also led to new challenges, taking into consideration the Covid-19 threat level. It is mandatory to reconsider all teams' standing operating procedures and to take all necessary measures to reduce the number of personnel acting in the same place. Equipment used for some drills should be reconsidered in order to be used by one person instead of two or three.

Discipline and respect to hygiene measures are the 'magic words' on ships to maintain a healthy environment. The risk of Covid-19 infections has already led to a re-evaluation of teams and crews taking into account that the level of readiness could decrease. Infected personnel may have a harder time recovering from COVID-19 infection, and some aspects of the crews' enrollment may occur, sometimes lasting several months. Moreover, rapid re-employment of recovered personnel can be supported by the existence of psychological assistance on board, checking body temperature more often, and reducing the interaction time with other crew members.

Conclusion

In the future, all nations have to identify new aspects of diplomacy, military, economic, intelligence, financial, legal, and research & development to prevent a triple threat: the global pandemic, economic depression, and new types of risks and threats.

The Euro-Atlantic community is very interested in the Black Sea region due to the strategic importance for regional stability and security. The Black Sea riparian states have to take all necessary measures to control other countries' citizens crossing borders, to manage freedom of movement, and to contribute to common NATO and EU security. At the same time, in the pandemic environment it is difficult to work as it was directed under 'normal' conditions. International relations are strongly influenced by inclinations toward some aspects of isolationism and singular efforts to fight against the spread of Covid-19, in accordance with national interests. The new disposition of maritime security is to alter the area of influence from the global to the regional level. Globalization has suffered, and the transition from globalization to regionalization, due to the negative influences of the virus, is an unprecedented situation in international relations theory.

The changes in the dynamics of maritime security are unprecedented. New inflections of maritime security regionalization after the identification of current threats in the Black Sea region will be observed as soon as the countries in the region have analyzed their identified lessons and implemented them in new (maritime) security strategies. The previous maritime security strategies have to be re-analyzed by geopolitical analysts and polished by politico-military specialists. The influence of unconventional threats will severely affect national instruments of power.

It is possible that this moment is the beginning of a new type of readiness assessment. It is time to act more and more in the development of future equipment and platforms that use a very small number of sailors. Thus, unmanned vehicles used in all environments, such as drones, ROVs, UUVs, UAVs and so on, could become the most widely-used tools to obtain information, plan operations, or execute assigned missions. These platforms can be used remotely during the planning process, for obtaining information about the enemy on the battlefield, or to execute high-precision attacks. Unmanned vehicles will allow for remote fighting for a very long period of time.

Any major Covid-19 outbreak or a similar viral infection may disable a majority part of a ship's crew and will diminish time spent on mission. In this way, the operational factors and the fundamental triangle of planning operations (*time – space – force)* will be affected by the reduced time spent by maritime task groups at sea and a reduced number of available platforms, incapable to act to accomplish their mission.

There is a strong need to plan and to foresee the future of preparedness and readiness of any navy. We must be prepared to respond to different pandemic scenarios. Approaches are different and these have to be supported by a common effort in determining the most appropriate measures, in developing new ways, and procedures to fight in the air, on the surface of the sea, and underwater.

An overarching future maritime ISR concept

Capt. (N) Todd Bonnar

All the business of war, and indeed all the business of life, is to endeavour to find out what you don't know by what you do.

Arthur Wellesley, 1st Duke of Wellington

1. Introduction

On 30 May 2020, SpaceX's Crew Dragon spacecraft carried NASA astronauts Doug Hurley and Bob Behnken into orbit for a rendezvous with the International Space Station. This spacecraft was the first to be designed, built and launched to space by a private entity. That's an accomplishment only three nations — the U.S., Russia and China — have achieved previously. As CNBC reported it, "The launch unlocks the possibility of a new era of sustained, private, commercial activity in space."[1]

A natural extension of the significance of CNBC's statement is to ask what impact commercialization will have on space-based military applications such as Intelligence, Surveillance, Reconnaissance (ISR). A celestial vantage point, as the ultimate high ground for overwatch, offers significant potential for satisfying a fundamental tenet of naval warfare: Maritime Situational Awareness (MSA). Having a clear picture and access to timely, relevant information is essential as it enables the early identification of potential threats and enhances appropriate responses. Information superiority through high quality MSA enables naval warfare commanders at all levels – tactical through strategic – to get inside their adversaries' OODA Loop.

The OODA loop was a tool developed by military strategist John Boyd to explain how individuals and organizations can win in uncertain and chaotic environments.[2] The ability to get inside your adversary's decision cycle of *Observe, Orient, Decide, Act* creates a Gordian Knot of threatening events and generates mismatches between what an adversary expects you to do and what you actually do. This makes your adversary feel trapped in an unpredictable world of doubt, mistrust, confusion, disorder, fear, panic, and chaos.[3] As the former Commandant of the Marine Corps, General Charles C. Krulak stated in his analysis of the Gulf War: "The Iraqi army collapsed morally and intellectually under the onslaught of American and Coalition forces. John Boyd was an architect of that victory as surely as if he'd commanded a fighter wing or a maneuver division in the desert."[4]

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[1] Michael Sheetz, "Why the first SpaceX astronaut launch marks a crucial leap for NASA's ambitions", *CNBC*, 3 June 2020, https://www.cnbc.com/2020/06/03/first-spacex-astronaut-launch-marks-crucial-leap-for-nasa-ambitions.html

[2] Taylor Pearson, "The Ultimate Guide to the OODA Loop", https://taylorpearson.me/ooda-loop/#4_Tempo_You_Must_Get_Inside_Your_Adversarys_OODA_Loop

[3] Ibid.

[4] Ibid.

When naval warfare operators think of ISR, minds are often immediately drawn to modern-day, advanced technological capabilities – low orbit earth observation or military communications satellites rapidly passing large data sets which ultimately result in operational outputs such as coordinated surface and subsurface TLAM strikes on shore-based targets or providing high resolution imagery to assist with ship and submarine movements. In reality, it is actually a system of systems that make up the space based ISR toolbox.

It is undeniable that NATO's joint maritime operations rely on space support provided by satellites, such as satellite communications (SATCOM), Position, Navigation, and Timing (PNT), and Intelligence, Surveillance, and Reconnaissance (ISR), as critical mission enablers. The services of ISR systems, in particular, have become more and more essential to NATO's decision-making and planning processes as the alliance continues to project deterrence based on strength, readiness and speed of response.

Some defence planners envision a future battlefield in which the ground is crawling with robots and the skies are darkened by drones. Swarms of unmanned systems would dominate in the battle for an ISR advantage. In reality, the issue of quantity versus quality when it comes to next-generation ISR is yet to be resolved. This is particularly the case in contested environments where targets are mobile or hidden, defences have proliferated, a drone's guidance systems can be jammed, and networks compromised. In such a world, more sophisticated platforms deploying multiple sensors of greater range and acuity and carrying defensive and even offensive capabilities may make more sense.

It is widely agreed that as civilization entered the age of information, militaries have seen ISR capabilities expand in the air, land, maritime, space, and cyberspace domains, across today's knowledge-based environment. Although one could argue that acting on knowledge is absolutely nothing new, it is also just as easy to argue that the complexity and the sheer volume of data and information management that indeed makes this the 'Age of Information". Thus, we now find the 'knowledge-based environment' in which today's modern navies must operate.

If NATO is to succeed in the race to master this "knowledge-based environment", it has to optimise maritime ISR and, in turn, is compelled to consider the range of options available and add more tools to the ISR toolbox, including resiliency through commercial applications. In a post-Covid economy, this will be difficult to accomplish with military acquisitions competing with much required social and economic projects. Thus, NATO members need to look at more cost-effective options and models for acquisition and implementation.

2. NATO & ISR

Joint ISR (JISR) remains a key capability allowing allies to gain and maintain decision advantage in peacetime and crisis. The last two decades of continuous conflict with multiple actors and terrorist organizations around the world have reinforced one consistent lesson to the alliance: the importance of information, surveillance and reconnaissance (ISR) capabilities. Aligning efforts under the JISR initiative, NATO members have made substantive gains in developing an array of agile, flexible and interoperable capabilities. The ability to task, collect, process, exploit and disseminate vast amounts of information from multiple types of sensors is vital to successfully prosecute the adversary. Now, the alliance is confronting new and evolving threats with the knowledge and, in a growing number of cases, the resources to counter current ISR capabilities.

NATO recognizes the strategic necessity of the further development of JISR capabilities. The alliance currently fields a broad range of JISR capabilities that provide comprehensive situational awareness and decision support, and those capabilities can be reinforced by national capabilities as required. The NATO Defence Planning Process (NDPP) aims to harmonize national defence planning efforts and prioritizes JISR as a strategic enabler in achieving NATO's level of ambition.

The events of 2014 marked a significant turning point for NATO. Russia's actions in Ukraine and the annexation of Crimea set in motion a series of discussions within NATO's top leadership about strengthening cooperation and ensuring tighter connections between allied forces. During the Wales Summit later that year, the assembled heads of state and government expressed the ambition to provide NATO with an enduring and permanently available Joint ISR (JISR) capability, giving the alliance the eyes and ears it needs to achieve strategic decision advantage over a resurgent Russia.[5]

In the event of crisis or conflict, NATO's members would in almost all cases initially be reacting to an adversary who would control the preliminary timing or initiating actions. Analyses through wargaming, modelling and simulation, and combat experience have shown that blue (friendly) force attrition and asset requirements can be significantly reduced if an enemy can be engaged at the onset of aggression. Hence the reason why rapid and persistent multi- domain awareness through ISR is so critical to NATO. It provides information and intelligence to key decision-makers, helping them make well-informed, timely and accurate decisions.

[5] Tristan Lovering, "JISR Workshop: Ensuring that future commanders see 'the other side of the hill'", *Joint Warfare Centre*, 2014, http://www.jwc.nato.int/images/stories/threeswords/NOV_JISR_Workshop.pdf

NATO's JISR project brings together data and information gathered through disparate yet inter-related projects such as NATO's Alliance Ground Surveillance (AGS) system or NATO AWACS surveillance aircraft as well as a wide variety of national JISR assets from the space, air, land and maritime domains. The Initial Operational Capability (IOC) for JISR was declared in February 2016.[6] Both surveillance and reconnaissance include visual observation (from forces on the tactical battlefield) and electronic observation (for example from satellites, unmanned aircraft systems, ground sensors and maritime vessels), which are then analysed, turning information into intelligence.

Imagery Intelligence (IMINT) is intelligence derived from imagery acquired by sensors which can be ground-based, seabourne or carried by air or space platforms. The information conveyed by an image or full motion video is clear and concise. It will often serve to support or confirm intelligence derived from other sources.

Measurement and Signatures Intelligence (MASINT) is intelligence produced by quantitative and qualitative analysis of physical attributes of targets and events to characterize, locate, and identify them.[7] It is derived from specialized, technical measurements of physical phenomenon inherent to an object or event where the measurement refers to actual measurements of parameters of an event or object. An example of this would be flight profile and range of a cruise missile. Signatures are typically the products of multiple measurements collected over time and under varying circumstances.

MASINT consists of the following data sources:

- Electro-optical;
- Radar;
- Radio frequency;
- Geophysical;
- Materials;
- Nuclear radiation.

MASINT can include electromagnetic pulse emissions associated with nuclear testing or other high energy events for the purpose of determining power levels, operating characteristics, and signatures of advanced technology weapons, power, and propulsion systems.

[6] NATO, "Statement by defence ministers on the declaration of the initial operational capability for Joint Intelligence, Surveillance, and Reconnaissance", Press Release, 10 February 2016, https://www.nato.int/cps/en/natohq/official_texts_127831.htm?selectedLocale=en
[7] US Naval War College, "Intelligence studies: types of intelligence collection", https://usnwc.libguides.com/c.php?g=494120&p=3381426

Signals Intelligence (SIGINT) is intelligence derived from the collection and exploitation of foreign electromagnetic signals or emissions. It is the generic term used to describe communications intelligence (COMINT) and electronic intelligence (ELINT) when there is no requirement to differentiate between these two types of intelligence, or to represent their fusion.

Geospatial Intelligence (GEOINT) is an intelligence discipline that has evolved from the integration of imagery, IMINT, and geospatial information to a broader cross-functional effort in support of national and defence missions and international arrangements. Advances in technology and the use of geospatial data throughout the joint force have created the ability to use geography by integrating more sophisticated capabilities for visualization, analysis, and dissemination of fused views of the operating environment. This capability provides many advantages by precisely locating activities and objects, enabling safe navigation over air, land, and sea, assessing and discerning the meaning of events, and providing context for decision-makers.

A critical element of deterrence and defense, this networked system of sensors, collectors and analysts provides situational awareness, early warning and, if necessary, decision support for combat operations. Put simply, NATO's JISR is about getting the right information to the right person, at the right time in the right format. The question is, is it resilient enough to withstand operations at maximum level of effort?

The US Navy is countering multiple threat vectors (Russia, China, Iran, and North Korea). NATO's Maritime Enterprise draws on many of the same ISR assets that support the current NATO Military Strategy and raises the question of that strategy's viability with reduced resources even outside its effectiveness. It is thus necessary to look for ways to increase resiliency including rapidly accessible, commercial options.

3. Private industry & ISR

Our maritime forefathers such as Claudius Ptolemy, Ferdinand Magellan, Vasco de Gama and others who charted the globe would no doubt marvel at the geographic information available today. With technological advancements in small satellites, global information systems, aviation, digital photography, computer technology, and telecommunications, the market for high resolution satellite images and aerial photography is now accessible to virtually everyone.

Commercial technology should present NATO with several opportunities to improve the time available to detect and react to a threat and to shorten strategic and operational decisions as well as the find, fix, track, target, engage and assess (F2T2EA) process. In fact, a commercial satellite flying 488 miles above the Earth recently tracked and captured a

Russian Navy missile launch that took place in the Barents Sea.[8] An open-source intelligence analyst had been watching Russia's Northern Fleet closely. Racking up an impressive list of free satellite imagery, he was able to know where to look for the missile test. Later that same day, the analysts, using the same imagery, found a Russian submarine the moment it surfaced.[9]

In today's security environment, uncertainty will increase with respect to who, where, when, and how NATO military forces may be called upon to fight. Inexpensive technology now enables even those with minimal resources to threaten the security of alliance members and with acts ranging from hybrid warfare to conventional warfare or even terrorism obtain a high 'return on investment'.

Deterrence based solely on the strength of a response is no longer effective. Deterrence must be based on strength and speed of response. To achieve strategic and operational success for operations along the spectrum from deterrence to conflict, NATO must continue to invest in and leverage resilient and collaborative ISR capabilities that enhances situational awareness to enable counter-operations in the grey zone and aid rapid decision-making, and reliably find, fix, and target elusive targets deep within enemy territory in highly contested environments. The objective is to generate an information advantage for NATO forces.

As Deputy Assistant Secretary of the Navy for Research, Development, Test and Evaluation William Bray stated: 'Responding to a threat today means using unmanned systems to collect data and then delivering that information to surface ships, submarines, and aircraft. The challenge is delivering this data quickly and in formats allowing for quick action.'[10]
There are currently eight commercially supplied elements that NATO could look at to build resilient core construct of Space-based Global Maritime Awareness (GMA). This commercially supplied redundancy can increase resilience in ensuring ISR data to the various operational commands, enabling increased situational understanding and possibly targeting/cueing data needed to perform their mission within a highly contested environment:

- Automatic Identification System (AIS);
- Satellite AIS (S-AIS);
- Radio Frequency Geo-Location Satellites;
- Synthetic Aperture Radar (SAR) Satellites;
- Optical Satellites;
- Earth Observation Systems;
- Support from dynamic data analysis supported by Artificial Intelligence & Machine Learning

[8] H I Sutton, "Unusual satellite image shows Russian missile launch in Arctic", *Forbes*, 25 July 2020, https://www.forbes.com/sites/hisutton/2020/07/25/unusual-satellite-image-shows-arctic-missile-launch/#3ed3918f1223
[9] Ibid.

AIS

Navigators have historically determined course and location by observing other objects. This approach is vulnerable to adverse conditions, however, as well as to limitations on the observer's ability to track and interpret the characteristics of the target objects. Over time, the nature of sea transportation and operations has changed. At the same time, the possibility of a significant disaster, and the damage caused by the increased size of vessels and the volume of traffic, has worsened. Our perception of the dangers of sea transportation and tolerance to impacts has also been changing. Loss of life and property at sea, which has been a problem for sailors and travelers, can be prevented by adopting cutting-edge technologies. AIS was originally developed as an aid to navigation. The maturity of this information technology and information application technology has created opportunities for broader application in many areas, including safety and accident prevention, security, smart infrastructure and operations, transportation planning, cargo management, and the economy.

Typically, terrestrial AIS has a range of 27-54 nautical miles (50-100 km), which limits any long-range ship position knowledge for agencies that need a wide area surveillance of ship positions and activity. Ships of 300 gross tonnage or more sailing on international voyages, cargo ships of 500 gross tonnage or more sailing in local waters, and all passenger ships irrespective of size are mandated by the International Maritime Organization (IMO) to carry AIS equipment. AIS transponders automatically broadcast information at regular intervals. Signals are received by AIS transponders on other ships or by land-based systems. Governments and maritime insurers rely on the Automatic Identification System (AIS) as a vital means for monitoring the oceans, but AIS has severe limitations. Ships engaged in illicit activities can deactivate their AIS beacons, vanishing off the map. Alternative options for monitoring are resource-intensive. AIS signals have a horizontal range of about 40 nautical miles (74 km), meaning that AIS traffic information is only available around coastal zones or in a ship- to-ship zone.

The Vessel Identification System on the Columbus module of the International Space Station has monitored maritime traffic since 2010. This has been a successful testing of a system that has shown great improvements in monitoring global maritime traffic. The current ground-based AIS specified by the International Maritime Organization is a ship-and-shore-based broadcast system designed to monitor maritime vessels only in coastal waters. The AIS for Columbus, known as the Vessel Identification System, operates in the very high-frequency (VHF) maritime band and expands this capability. This AIS has been verified as a method of tracking global maritime traffic from space and incorporates maritime traffic in open waters. The autonomous system picks up signals from standard AIS transponders. The ISS's location at an altitude of 217 to 248 miles (350 to 400 km) is ideal for space-based AIS signal reception and provides the means to be utilized by multiple users.[11]

[11] NASA, "Tracking global marine traffic and saving lives", *Space Station Research*, 23 September 2019, https://www.nasa.gov/mission_pages/station/research/news/b4h-3rd/eo-tracking-global-marine-traffic

S-AIS

The probability of the detection of terrestrial AIS signals from space was presented in 2003, following advancements in satellite technology. Through constant development, research and cooperation between governmental and private organisations, S-AIS has been continuously evolving. Advancements in signal and data processing techniques have resulted in an improved detection over vast areas outside of terrestrial range. Some of the challenges of S-AIS technology include satellite revisit times, message collision and ship detection probability. Data processing latency and lacking the continuous real-time coverage made it less reliable for end users in certain aspects of monitoring and data analysis. Recent developments and improvements by leading S-AIS service providers have reduced latency issues.

Complementing terrestrial AIS and other technologies, near real-time S-AIS can further enhance all areas of the global maritime monitoring domain with emerging possibilities for maritime industry. S-AIS is a solution to overcome terrestrial coverage limitations with the potential to provide AIS service for any given area.

Radio Frequency Geo-Location Satellites

Space-based global maritime awareness came into being with the launch of the first S-AIS constellation in 2008 but it really was not complete as a system until the launch of unclassified radio frequency (RF) satellites in 2019.

It has been recognized for some years that RF geolocation would be a useful tool for maritime awareness, especially when used in collaboration with S-AIS. It fills a need to track ships when they turn off their AIS, but AIS is still required to identify the ships on initial contact before they turn it off. These two systems are complementary, maybe even more synergistic than first envisioned.

RF geo-location satellites provide tools designed to answer questions that AIS alone cannot answer. The broader RF range expands visibility to help locate AIS dark ships and identify anomalous behavior. Using machine learning and artificial intelligence to generate higher-order analytics further assists with revealing patterns of behavior about objects such as warships at sea. RF analytics helps fill critical knowledge gaps. But by fusing multi-source data sets, RF geo-location satellites can deliver deeper insights than previously commercially available. For example, an RF data layer enriches satellite imagery analysis, both guiding where to look and helping assess what is being viewed.

Synthetic Aperture Radar (SAR)

SAR refers to a technique for producing fine-resolution images from a resolution-limited radar system. It requires that the radar be moving in a straight line, either on an airplane or orbiting in space. It is an active system with its own microwave illuminator. Its microwave-operating frequencies are chosen so that the radar imaging is unaffected by weather or light. SAR is the only imaging system that can generate high resolution imagery at any time, even in inclement weather or darkness.

The basic principle of any imaging radar is to emit an electromagnetic signal toward a surface and record the amount of signal that bounces back, or "backscatters," and its time delay. The resulting radar imagery is built up from the strength and time delay of the returned signal, which depends primarily on the roughness and electrical conducting properties of the observed surface and its distance from the orbiting radar.[12]

SAR is a type of active data collection where a sensor produces its own energy and then records the amount of that energy reflected after interacting with the earth. While optical imagery is like interpreting a photograph, SAR data requires a different way of thinking in that the signal is instead responsive to surface characteristics like structure and moisture.[13]

SAR creates imagery using radar, giving it different capabilities than traditional electro-optical satellite imagery. In addition to being able to produce images regardless of inclement weather or poor lighting conditions, SAR can provide data on material properties, moisture content, precise movements and elevation.

Synthetic aperture radars collect data in the visible, near infrared, and short-wave infrared portions of the electromagnetic spectrum. Radar sensors utilize longer wavelengths at the centimeter to meter scale, which gives it special properties, such as the ability to see through clouds (view electromagnetic spectrum to the right). The different wavelengths of SAR are often referred to as bands, with letter designations such as X, C, L, and P.[14]

It has now become increasingly common for earth observation scientists to fuse optical and SAR data sets into one analysis stream. However, the sheer volume of the almost non-stop influx of such data makes this a challenge to interpret. Technical advancements, on the other hand, are enabling an ever-increasing number of data sources to be exploited and analyzed in greater depth and detail to derive the unique insights to make even more informed decisions.

[12] NASA-ISRO SAR Mission, "Overview", *Get to know* SAR, https://nisar.jpl.nasa.gov/mission/get-to-know-sar/overview/
[13] EarthData, "What is Synthetic Aperture Radar?", https://earthdata.nasa.gov/learn/what-is-sar
[14] Nathan Strout, "Capella Space will share synthetic aperture radar imagery with NGA", *C4ISRNet*, 25 June 2020, https://www.c4isrnet.com/battlefield-tech/space/2020/06/25/capella-space-will-share-synthetic-aperture-radar-imagery-with-nga/

Optical Satellites

Opto-electronic satellites can be considered to be passive. They examine the surface of the earth across a varied spectrum of electromagnetic radiation frequency, especially at wavelengths typical for visible light or for infrared.[15] The demand for real time or near real time visual identification and tracking of targets drove the development of ever more compact, higher resolution video cameras placed in orbit. As new technologies became available, technicians added sensors operating in other portions of the electro-magnetic spectrum creating a capability for multi-spectral ISR. These 'bolt on' sensors function in the optical part of wavelength spectrum, and include visible, near infrared and short-wave infrared wavelengths. The satellites in question make use of the fact that some of the sunlight that is not absorbed on the surface of the earth is reflected back into space. They may only capture images of good quality if the weather and the sun permit.

The trend of the civilian customer-market driving innovation and technological breakthrough will continue, making access to new technologies easier than before. In the near future, forward deployed maritime forces will need to be augmented by unmanned tools such as space-based ISR as they contest adversaries in traditional and non-linear battlespaces and as such, the alliance, should consider the range of options available and add more tools to the ISR toolbox, including rapidly accessible, commercial options.

4. The adversary & ISR

In today's security environment, uncertainty will increase with respect to who, where, when, and how NATO military forces may be called upon to fight. Inexpensive technology now enables even those with minimal resources to threaten the security of alliance members. It is without question that evolving threats and concepts of operations are driving the need for more and better ISR capabilities. More technological advances are likely to occur in the next five years than have occurred in the preceding 25 years (from the time when the World Wide Web was adopted as common usage).

Most of these advances, on which nations and navies will have to capitalize, will come from the commercial sector, presenting a two-faceted dilemma for NATO. Firstly, as with most technological advancements, it will be a difficult challenge for the current procurement process of most NATO nations to keep current through organic development of ISR assets. The current procurement process for NATO nations concentrates on buying large capital projects – ships, airplanes, tanks, and their spares and training requirements. Most of these items have lives that are measured in decades, with a few major upgrades over their lifetime. Information technology is changing on the timeline articulated in something known as Moore's Law and does not fit into such a process.

[15] Pawel Ziemnicki, "Optics or Radars? What is better for the earth observation purposes?", Defence24, 20 December 2018, https://www.defence24.com/optics-or-radars-what-is-better-for-the-earth-observation-purposes

Secondly, as described above, high-end ISR capabilities and products that were formally the sole domain of militaries of technologically advanced nation states, are now appearing readily available on the commercial market. This means that over time, entry costs into this market will continue to drop. It is foreseeable that in the near future, the free market will enable some lesser states and even non-state actors to have the option to commercially acquire their own ISR for operational planning and the conduct of lower-end fights. The possibility now exists that terrorists and insurgents could use sophisticated and detailed commercial intelligence products to plan attacks.

It is already starting to happen with other easy entry technology such as drones. Drones can be employed by terrorists and insurgents for intelligence, surveillance, and reconnaissance missions, or they can be weaponized. In Yemen, Houthi rebels used unmanned aerial systems to attack Saudi Arabian air defenses. Hezbollah, arguably one of the world's most advanced terrorist organizations, has used drones against IS forces in Syria. The Islamic State used a drone to drop grenades on an adversary's military base. And in early January 2019, Turkish-backed rebels used drones to conduct 'swarming' attacks on two Russian bases in Syria.[16]

Looking at ISR through a near-peer aperture of Russia, they see NATO's ISR as a prime target in their 'system of systems' approach to conflict. This system's approach, not dissimilar to an effects-based approach to operations, includes destroying an adversary's ability to execute an offensive campaign by 'achieving information superiority and functionally degrading their operations by eliminating their ability to effectively command and control their forces.'[17] Russia has established an anti-space force and developed a concept to counter NATO's C4ISR.[18]

China also employs a robust space-based ISR capability, designed to enhance its worldwide situational awareness. Used for military and civil remote sensing and mapping, terrestrial and maritime surveillance, and military intelligence collection, China's ISR satellites are capable of providing electro-optical and synthetic aperture radar (SAR) imagery, as well as electronic intelligence and signals intelligence data.[19]

[16] The Soufan Center, "IntelBrief: Terrorists' use of drones and other emerging technologies", 3 October 2018, https://thesoufancenter.org/intelbrief-terrorists-use-of-drones-and-other-emerging-technologies/
[17] Michael Kofman, "It's time to talk about A2/AD: Rethinking the Russian military challenge", *War on the* Rocks, 5 September 2019, https://warontherocks.com/2019/09/its-time-to-talk-about-a2-ad-rethinking-the-russian-military-challenge/
[18] Roger McDermott, "Russia's electronic warfare capabilities to 2025", *International Centre for Defence and Security*, September 2017, https://icds.ee/wp-content/uploads/2018/ICDS_Report_Russias_Electronic_Warfare_to_2025.pdf
[19] Defense Intelligence Agency, "Challenges to Security in Space", January 2019, https://www.dia.mil/Portals/27/Documents/News/Military%20Power%20Publications/Space_Threat_V14_020119_sm.pdf

China produces its military-dedicated satellites domestically and its civil communications satellites incorporate off-the-shelf commercially manufactured components. China is testing multiple next-generation capabilities, such as quantum- enabled communications, which could supply the means to field highly secure communications systems.[20]

5. Challenges with ISR

It is not the position of this paper to suggest that NATO simply signs contracts with the various space-based ISR vendors. The main argument being made is that demonstrating deterrence requires the ability to demonstrate resilience to the point where adversaries feel a lack of comparative advantage in a specific capability means 'the reward is not with the risk'.

To take advantage of the benefits offered by both commercially acquired and organically gleaned space-based ISR, a global network-centric naval communications and processing network architecture is needed for NATO's maritime domain – an architecture driven by the doctrine and overarching information architecture of a 'come as you are' rapid force application. The critical common denominator with these space based ISR systems feeding this information architecture is the data that each sensor collects and how it is aggregated to present much greater situational awareness or even situational understanding.

Data, a critical strategic, operational and tactical asset, is the underlying constituent to spawning the intelligence required to successfully support and execute NATO's three core missions. National security professionals from across the alliance advocate that the ability to harness the power of aggregated data is fundamental to building and deploying the most effective military alliance in the world and maintaining true deterrent effect. An inability to collect, analyze, and share data at a speed greater than NATO's potential adversaries will degrade situational awareness, command and control and will negatively impact allied forces.

It goes without saying that numerous challenges exist for JISR to successfully operate within a highly contested maritime environment even with an overarching information architecture. However, NATO could face significant challenges with harnessing the power of this aggregated data and making sense of what has been collected even in baseline activities and current operations. For example, networks, platforms, sensors, and military personnel must be able to penetrate adversary defenses, collect data, analyze that data and recognize threats and targets, and ultimately share that data with decision-makers, other sensors, and weapons, at machine-speed. Despite the JISR program, there are also known issues with a lack of standing data collection operations and further barriers posed by information sharing caveats and restrictions by various Alliance nations or even between entities within the NATO Command Structure.

[20] Ibid.

Intelligence analysts are contending with having access to too much data, which can have a debilitating effect when attempting to discover high-value data in order to generate insights, especially rapidly. It is this challenge that has led toward developing disruptive technology, such as AI/ML, that allows for human-machine teaming to ultimately help analysts make sense of the tidal wave of data. All domain ISR modernization will cover a "range of capabilities" by incorporating new AI/ML tools and using new intelligence sources, to include publicly available information.

Before NATO begins to address these operational challenges, it could be argued that there are three foundational hurdles that must be overcome to truly make commercially acquired space-based ISR an option:

The lack of a NATO capstone big data strategy

Building a data strategy for the alliance provides the framework for exploiting data as the trend moves toward future warfare with artificial intelligence, autonomy, robotics, etc. While STANAGs are in place on how to store and tag data, the real issue is whether these standards are being enforced. If data is not stored properly nor in a manner for proper use, then the alliance is not farther ahead in meeting machine learning goals. In not providing a data strategy now, steps are skipped that will lead to larger consequences in the future. Data is a strategic asset with a subjective value that NATO's competitors will continue to interfere with. Now is the time to create the strategies that are needed to support future warfare.[21]

Data formats leading to limitations in data discovery

Any solution to challenges in achieving interoperability will require addressing both organizational and technical issues. Despite the large number of organizations involved in addressing interoperability, there continue to be significant issues, even across releases of a single system. The implementation of systems capable of working together and a common data standard improves both response time and situational awareness. Automatic information processing and increased understanding and response of specialised personnel can be decisive factors that increase the pace of decision-making processes. Using standard data formats can help operators rapidly identify and access current threats and determine the necessary course of action.[22]

[21] LCdr Jay Huls, *Call for Big Data Strategy,* Combined Joint Operations from the Sea Centre of Excellence
[22] CDR Neculai Grigore, *Naval Operations – Cyber Interoperability*, Combined Joint Operations from the Sea Centre of Excellence

Contending with the sheer abundance of data generated across the globe

In any future wars or even within a future environment of competition, victories and deterrence, success will increasingly depend on the systematic synchronization of the physical, informational, and cognitive battlefields, all augmented by algorithmic warfare. However, in the interim, the issue of data saturation is significant. The rapid rise in NATO's ability to collect data hasn't been matched by the alliance's ability to support, filter and manage the data. The alliance needs to develop a holistic vision for Big Data, enforce strict data protocols and develop and adapt to AI and machine learning in order to truly optimise its ISR capabilities. NATO as a whole must maintain its adaptability and agility in a highly competitive international environment with all nations collaborating in preparation for the transition to an AI-powered, highly interconnected world, because such a world will not tolerate weak links in defences.[23]

6. Conclusion

Since the end of the Cold War, Russia has sought to sustain its atrophying ISR and remote sensing satellite fleet, despite funding shortfalls, economic sanctions, and technological setbacks. Longstanding technological and cost barriers to space are falling, enabling more countries and commercial firms to participate in satellite construction, space launch, space exploration, and human spaceflight. Both Moscow and Beijing have indicated that they view space as important to modern warfare and view counterspace capabilities as a means to reduce potential adversaries' military effectiveness.[24] Both reorganized their militaries' force structures and operational doctrines, emphasizing the importance of space operations. Likewise, Iran and North Korea also pose a challenge to militaries using space-enabled services, as each has demonstrated jamming capabilities. Iran and North Korea maintain independent space launch capabilities, which can serve as avenues for testing ballistic missile technologies.

It is imperative that NATO, now more than ever, must take steps to maintain resiliency in operations, especially ISR. ISR is a military operation intended to help 'decision makers anticipate change, mitigate risk, and shape outcomes.'[25] The alliance must demonstrate strength and speed of response in both the traditional domains and non-linear battle spaces, such as space, cyber and the information domains as deterrence based solely on the strength of a response is no longer effective. Deterrence must be based on cognitive superiority.

[23] Can Kasapoglu, Baris Kirdemir, "Artificial intelligence and the future of conflict", *Carnegie Europe*, 28 November 2019, https://carnegieeurope.eu/2019/11/28/artificial-intelligence-and-future-of-conflict-pub-80421
[24] Defense Intelligence Agency, "Challenges to Security in Space"
[25] John R. Hoehn, Nishawn S. Smagh, "Intelligence, Surveillance and Reconnaissance for Great Power Competition", *Congressional Research Service*, 4 July 2020, https://crsreports.congress.gov/product/pdf/R/R46389

In terms of capabilities the NATO call will be to develop further 'an array of robust, sophisticated, and evolving capabilities across all domains, including heavier, more high-end, fully supported and deployable, sustainable, and interoperable forces and capabilities that are held at high readiness to perform the whole range of Allied tasks and missions.'[26] If the NATO Maritime Enterprise is to succeed in the race to master this knowledge-based environment, it has to lead efforts to optimize maritime ISR in both the NATO Command Structure and the NATO Force Structure. In turn, it is compelled to consider the range of options available and add more tools to the ISR toolbox, including rapidly accessible, commercial options to increase resiliency.

The trend of the civilian market driving innovation and technological breakthrough will continue, making access to new technologies easier than before.[27] To take advantage of the benefits offered by network-centric capabilities, a global network-centric naval communications and processing network architecture is needed for NATO's maritime domain.

NATO's ISR architecture for future naval strike groups should exploit communications and information-management capabilities, employ a shortened and more effective command-and-control chain, access ISR capabilities provided by national and joint systems, and provide the ability to establish interoperability. ISR in the maritime domain is an enabler of MSA and of the full spectrum of maritime activities. As such, NATO MISR assets should be interoperable and readily available to be integrated in a coalition force. Critical capability shortfalls should be mitigated with the development and procurement of new platforms, sensors and systems taking advantage of new and emerging technologies.

NATO needs to modify its collective aperture to the perspective on ISR that changes from a platform-centric view to one based on capabilities spread over multiple platforms. This is a deliberate approach to better consolidate strategic ISR collection capabilities with those focused on the operational and tactical levels, as well as to integrate those platforms that can only perform some of the kill chain functions with those able to execute the remainder. The key to this concept is interoperability and integration; the ability to share information.

In a post-Covid environment where national economies will be recovering for years, resources dedicated to military acquisitions are unlikely to be prioritised and will instead be competing with much required social and economic impetus projects. It is thus important to look for ways to increase resiliency including integrating rapidly accessible, commercial options into the ISR toolbox.

[26] Dick Zandee, "The future of NATO: Fog over the Atlantic?", *Clingendael – Netherlands Institute of International* Relations, 2018, https://www.clingendael.org/pub/2018/strategic-monitor-2018-2019/the-future-of-nato/
[27] Ibid.

PANEL-III
WHAT MUST BE DONE TO TACKLE MARITIME SECURITY CHALLENGES DURING AND/OR AFTER THE COVID-19 PANDEMIC?

INTRODUCTION

During the Maritime Security Conference-2020, the third session provided insights into what needs to be done to tackle maritime security challenges, both during and after the pandemic. It provided extremely useful pointers for future considerations on the operational as well as the strategic level. The following five articles underline the diversity of challenges while also pointing towards potential ways to address them.

The first article looks at the broader impacts of COVID-19 on maritime security, both in the short and medium term. It is followed by a look at autonomous systems employed by navies and how these can be used to enhance capacities in the coming years. Potential means of addressing specific maritime security challenges are then examined in the next article, based on a case study from the South China Sea. This is followed by a detailed study of advanced analysis and data fusion capabilities for improved risk analysis at sea. The final article in this section then looks at the potential role of navies in the coming years.

Outlook on maritime security challenges in a pandemic environment

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The impact of Covid-19 on the global economy in general and on maritime trade in particular has been huge. All segments of the shipping industry have been affected by the pandemic, but to extremely varying degrees. Among other things, shipping companies face the possibility of staff or crew members contracting the virus while also dealing with restrictions in port calls and crew changes, impacts on cargo volumes as well as work-from-home arrangements for shore-based staff and key suppliers.

Whether Covid-19 will have equally wide-ranging impacts on maritime security challenges is much harder to say. Even before the pandemic, merchant ships had to face at least some operational concerns in different regions across the world. At the same time, navies and maritime law enforcement agencies were dealing with a broad range of issues – from piracy to irregular migration, from drug smuggling to illegal fishing.

By and large, maritime security challenges in different regions may be similar in nature, but the combination of issues is usually very specific. Moreover, Covid-19 has not led to an immediate increase of threat levels around the world despite various headlines suggesting the contrary, discussed in more detail below. In the medium to long term, however, measures to curb the spread of Covid-19 may have unwanted side effects. Coupled with other factors, these measures could lead to an increasing number of maritime security challenges on the reginal, national or even local level. Some of the potential longer-term problems are outlined in Section 2.

At the same time, most governments around the world will face budgetary pressure in the coming years. Revenue shortfalls and increased spending in other areas are likely to result in strict budget limits for navies and other maritime agencies. In short, naval planners should prepare for 'doing more with less', i.e. tackling additional tasks without obtaining many assets. The implications – and some potential remedies – are discussed in Section 3.

1. Changing threats?

When the number of people infected with Covid-19 began to increase outside of China, governments around the world took rapid and drastic measures to curb the further spread of infections. These measures included lockdowns of national economies as well as travel restrictions on an unprecedented scale.

The impacts on the maritime sector in general and on commercial shipping in particular were diverse. An economic slow-down led to an almost immediate decrease in demand for cargo capacities, affecting virtually all types of vessels from tankers to bulk carriers and container ships. Cruise shipping in particular came to virtual standstill and the future for the sector looks extremely bleak.

Meanwhile, crew changes were often impossible and many seafarers had to remain on their vessels for several additional weeks or even months. Planned crew replacements are still complicated by travel restrictions, quarantine requirements and a lack of available flights. In September, the International Maritime Organization reported that around 400,000 seafarers remain stuck on their vessels, threatening 'the fundamentals of ship safety standards' due to fatigue and mental exhaustion.[1]

When it comes to security threats in the maritime environment, however, the impact of Covid-19 is – at least so far – extremely limited. The pandemic has not led to an immediate increase of threat levels around the world. Existing maritime security changes have not disappeared, yet they have not been exacerbated either. More importantly, local or regional conditions are more important than the global Covid-19 situation when it comes to determining possible changes in threat levels.

Various articles and media reports would suggest the contrary, especially when it comes to piracy which is arguably the most headline-grabbing threat for merchant ships. 'Piracy is on the rise, and coronavirus could make it worse'[2] or even an alleged 'Surge of Piracy amid Coronavirus Outbreak'[3] are just two noteworthy examples, published in May and October 2020 respectively. Neither article, however, shows a causal link between an economic downturn caused by measures to curb the spread of Covid-19 and the number of reported piracy cases in specific regions.

One article in July[4] underlined the need to take a close look at underlying figures. It attributed the fact that attacks against across Asia doubled during the first half of 2020 –compared with the same period in 2019 – to 'the coronavirus downturn'. Looking at the monthly figures, however, it is obvious that the number of incidents in the Singapore and Malacca Straits – where around half of all incidents in Asia were recorded – increased in January and February, compared with the previous year (see Figure 1).

[1] International Maritime Organization, "400,000 seafarers stuck at sea as crew change crisis deepens", *IMO Press Briefings*, 25 September 2020, https://www.imo.org/en/MediaCentre/PressBriefings/pages/32-crew-change-UNGA.aspx.
[2] Brandon Prins, "Piracy is on the rise, and coronavirus could make it worse", *World Economic* Forum, 15 May 2020, https://www.weforum.org/agenda/2020/05/global-sea-piracy-coronavirus-covid19/.
[3] Theo Locherer, "Surge of Piracy amid Coronavirus Outbreak", *Global Risk* Insights, 4 October 2020, https://globalriskinsights.com/2020/10/surge-of-piracy-amid-coronavirus-outbreak/.
[4] Lucy Martin, "Coronavirus: Piracy incidents double across Asia during pandemic", BBC, 17 July 2020, https://www.bbc.com/news/business-53426890.

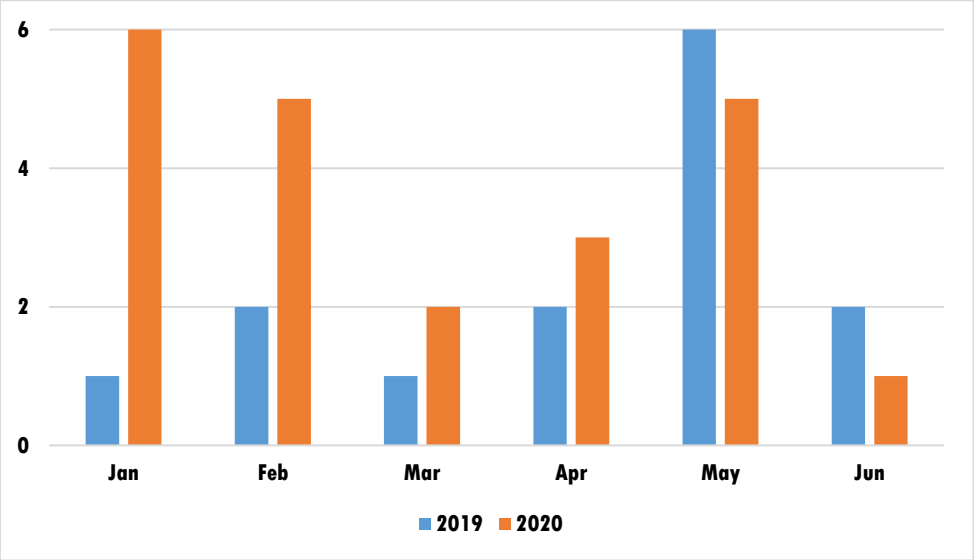

Figure 1: Number of maritime security incidents in the Singapore and Malacca Straits per month in 2019 and 2020 (Source: Risk Intelligence System)

When Covid-19 cases started to spread beyond China and other countries across the region started to implement drastic measures, the overall number of incidents between March and June remained stable. From July to September, the number of incidents was even lower than in 2019 with no attack reported in September 2020. In short, Figure 1 highlights that causality does not equal causation. While there has been an increase in piracy incidents across Asia during the first half of the year, there is no evidence to suggest that this increase was caused by the pandemic simply because both events took place at the same time.

At the same time, it is important to note that maritime security challenges may indeed be influenced by the Covid-19 situation, yet it is generally too early to assess the actual impact. For example, the number of migrants crossing the Gulf of Aden or the Red Sea from the Horn of Africa to Yemen decreased by 86 percent between January and August 2020[5], compared with the same period in 2019. Figures in January and February were comparable with the previous year, but the number of arrivals registered by the International Organization for Migration started to drop in March when the first Covid-19 restrictions were implemented. It is too early to assess, however, whether the new situation was really the only reason behind this drop in irregular maritime migration.

[5] International Organization for Migration, "Situation Report August 2020", *IOM Yemen*, 2 September 2020, https://www.iom.int/sites/default/files/situation_reports/file/en_iom_yemen_situation_report_august_2020.pdf.

Similarly, reports from the Singapore-based Information Fusion Centre (IFC) suggest an increase in contraband smuggling within the IFC Area of Interest – covering a large part of the Asia-Pacific region – since the spread of the pandemic. Interdictions more than doubled between January and July, yet the overall number of interdictions across the entire area was still only 31 in July. Significant changes in percentage terms therefore tell a different story than a look at the actual number of reports. These may have increased due to seasonal variations or targeted law enforcement operations in specific months. Again, it is simply too early to assess the impact of the pandemic on maritime smuggling routes across Asia based on very limited data.

As mentioned above, maritime security challenges which were already present before the outbreak of Covid-19 remain relevant. While the pandemic may have impacts on those challenges in the longer term, local and regional factors have to be analysed carefully to determine changes in actual threat levels. Looking at different types of challenges in various regions around the world, this becomes even more obvious.

Very broadly speaking, it is possible to identify three groups of threats which can be found in different regions:

- Crime-driven threats such as piracy which may be a major concern for commercial shipping operations, depending on the types of attacks. Perpetrators are profit-driven and in many cases, it is possible to at least mitigate the resulting risks, for example by implementing recommended best management practices.[6]2

- Geopolitical threats which rarely have a direct impact on the operations of merchant ships but may lead to knock-on effects. Problems with navigational systems are a practical example. Jamming of satellite-based navigation systems may be aimed at naval vessels yet merchant ships are also affected when such operations are conducted.

- Region-centric threats such as those found in the broader Middle East where rivalries between Iran, Saudi Arabia and other Gulf states have already impacted shipping operations. The two most notable incidents took place in May and June 2019 when several tanker vessels were damaged by unidentified attackers off Fujairah[7] and in the Gulf of Oman[8] respectively. Despite these widely-published incidents, the actual impact on merchant ships has been limited so far, yet shipping companies are concerned about insecurity and lack of available mitigation measures.

[6] Stakeholders from the maritime industry have published documents with best management practices and other guidelines which are supposed to deter attackers and decrease the likelihood of successful boardings. Relevant documents are region-specific and updated infrequently; the most up-to-date guidelines can be found at https://www.maritimeglobalsecurity.org.
[7] Rania El Gamal, Bozorgmehr Sharafedin, "Saudi oil tankers among those attacked off UAE amid Iran tensions", *Reuters*, 13 May 2019, https://www.reuters.com/article/us-saudi-oil-tankers-fujairah-idUSKCN1SJ088.
[8] Frank Gardner, "Gulf of Oman: Saudi Arabia blames tanker attacks on rival Iran", *BBC*, 15 June 2019, https://www.bbc.com/news/world-middle-east-48648788.

In addition to this list, one caveat should be noted. The situation in any particular region is often not exclusively characterized by one group of threats. In the Middle East, for example, region-centric and geopolitical threats overlap while examples for all three groups of threats can be found in Southeast Asia.

Furthermore, stakeholders may have different priorities when it comes to addressing the threats. In the Gulf of Guinea, for example, shipping companies are mainly concerned about piracy attacks. Most governments across the region, on the other hand, are particularly worried about transnational organised crimes such as illegal fishing or smuggling of fuel, weapons and other legal and illegal cargoes.

2. Long-term outlook

Despite the lack of immediate pandemic-related impacts on maritime security challenges around the world, a broad range of challenges remains. These are likely to evolve over time and often have to be addressed by navies in coordination with other maritime agencies. Keeping different types of challenges in check requires constant adjustments and updates to tactical and operational procedures. Learning lessons from other regions or other organisations should therefore be a routine task rather than an ad hoc instrument. Institutions such as the various centres of excellence within NATO are vital in this context as they provide a forum for the exchange of ideas, examples and best practices.

Identifying threats and potential threats as well as the resulting risks in a particular region also requires sound analysis. Various factors have to be considered, ranging from local law enforcement capacities and existing criminal networks to changes in trade patterns and geopolitical developments, to name but a few. At the same time, factors which must be considered for analysis purposes change over time, sometimes on short notice. It is therefore important to organise the analysis and response process in a circular format to incorporate constantly changing information as well as feedback from operations (see Figure 2).

Figure 2: Schematic depiction of threat/risk analysis and assessments in the context of operational planning (Source: Author's diagram)

Figure 2 underlines that analysis should be both the starting and end point for any type of operation. It is the prerequisite for a thorough assessment of threats and risks, often used synonymously even though these are distinctly different. Broadly speaking, threats can only be addressed over time whereas risks can often be reduced immediately by limiting vulnerabilities or – in some cases – potential consequences. Moreover, the same type of threat may lead to different risk levels for different types of operations.

In general, the circle shown in Figure 2 may be implemented in different ways by various organisations. For example, shipping companies as commercial organisations would assess the risks to their operations not in the same way as naval planners. Nevertheless, an evaluation is an extremely useful tool as it provides valuable input for future analyses. It also helps to identify lessons learned which can then be shared internally as well as with partners or other stakeholders.

Figure 2 also helps to show the key difference between safety and security threats. In a nutshell, safety threats are static, meaning that the analysis part is much less complicated. In most cases, it can be limited to the actual evaluation and how the results impact the assessment of safety threats and risks. Security threats, on the other hand, are dynamic. They require a much more nuanced view which takes a broad range of constantly changing inputs into account. Unfortunately, safety and security threats are often conflated[9], showing a severe lack of understanding for key differences in terms of analysis and assessment.

The economic impact of measures to curb the spread of Covid-19 infections is a perfect example. Most of these impacts are not directly related to maritime security challenges, yet it is the task of analysts to determine whether at least some specific issues should be monitored particularly closely over the coming months and years.

One of these issues may be the downturn in the tourism sector which has been hit particularly hard by the pandemic. Up until 2019, tourism has contributed a significant percentage to the GDP in many countries around the world. Looking specifically at countries where at least some maritime threats can already be identified, the GDP share of the tourism industry used to be significant in Indonesia (6 percent[10]), Egypt (6 percent[11]) and Mexico (8 percent[12]). All figures relate to 2018 but nothing suggests major changes in 2019 or even early 2020.

[9] For a recent example, see Christian Bueger, "The Mauritius Disaster: Overlooked Dimensions of Maritime Security", *The Diplomat*, 12 August 2020, https://thediplomat.com/2020/08/the-mauritius-disaster-overlooked-dimensions-of-maritime-security/.
[10] "Indonesia – Contribution of travel and tourism to GDP as a share of GDP", Knoema, accessed 2 January 2021, https://knoema.com/atlas/Indonesia/topics/Tourism/Travel-and-Tourism-Total-Contribution-to-GDP/Contribution-of-travel-and-tourism-to-GDP-percent-of-GDP.
[11] "Egypt – Travel and tourism direct contribution to GDP as a share of GDP", Knoema, accessed 2 January 2021, https://knoema.com/atlas/Egypt/topics/Tourism/Travel-and-Tourism-Direct-Contribution-to-GDP/Travel-and-tourism-direct-contribution-to-GDP-percent-of-GDP.
[12] "Mexico – Travel and tourism direct contribution to GDP as a share of GDP", Knoema, accessed 2 January 2021, https://knoema.com/atlas/Mexico/topics/Tourism/Travel-and-Tourism-Direct-Contribution-to-GDP/Travel-and-tourism-direct-contribution-to-GDP-percent-of-GDP.

The spread of Covid-19 cases beyond China, however, changed the situation almost overnight. Around the world, tourism has come almost to a standstill and there is nothing to suggest a quick return to the previous situation. National economies are likely to adapt over time and there is no direct link between high unemployment rates, a lack of economic opportunities and overall crime rates. Nevertheless, the situation should be closely monitored to determine potential changes in the situation related to maritime security as early as possible.

Tourism aside, various other economic factors may have a knock-on impact on the security situation in general and on maritime security in particular. Prices for crude oil and other natural resources are the prime example, while agricultural commodities are vital for other countries. Analysis becomes even more complex when it is concerned with the impact of longer-term developments. Digitalisation or the – potential – re-organisation of supply chains are two aspects which were discussed even before the pandemic. Changes may be accelerated now as circumstances have changed and large companies may try to limit the complexity of their global supply chains.

While such changes are more likely to affect the commercial operations of shipping companies, it is important for analysts to know about such developments and assess the impact on maritime security challenges. The same is true for the more immediate effects of the pandemic on the national as well as on the regional level. Depending on economic structures, law enforcement capacities and various other aspects, the impact of Covid-19 – as well as of measures to curb the spread of the virus – is extremely different, even in neighbouring countries. Among other things, these differences may have an impact on maritime security challenges, given that these are largely influenced by regional factors as explained above.

3. Summary

Summarising the developments related to maritime security, it should be stressed once again that there is no evidence for any direct and short-term impacts of Covid-19 on security challenges at sea. However, given the wide-ranging effects of the pandemic, it is at least likely that there will also be an impact on the security situation at sea. Even though it is currently too early to assess any medium or long-term developments, it is vital to identify relevant indicators and monitor as well as adjust them on an ongoing basis.

As stated above, security threats are dynamic and require a different type of analysis compared to relatively static safety threats. Indicators are therefore very likely to shift over time. Some may no longer be valid for the threats at hand, some are even likely to be discarded as irrelevant, yet other indicators may be considered as replacements and ultimately improve the analysis process.

Furthermore, the largely regional nature of maritime security threats should also be reflected. Statistics about irregular migration on maritime routes, for example, are extremely useful in the Mediterranean but much less so in South America. Even challenges which are relevant in several regions may have to be analysed in a different manner. For example, data based on research about the extent of illegal, unreported and unregulated fishing, for example, is significantly different between West Africa, the western part of the Indian Ocean or the South China Sea.

Even though it is currently too early to assess the longer-term implications of an unprecedented global pandemic on maritime security challenges, it is unlikely that threat levels will decrease significantly or that specific threats will even disappear. The more likely scenario involves stable or somewhat increasing threat levels and – perhaps more importantly – a diversification of security challenges.

In a nutshell, today's navies already have to deal with an increasing number of constabulary tasks on top of the more traditional roles and operations. Naval planners therefore have to prepare to 'do more with less', i.e. tackle an expanding number of tasks without a corresponding increase in human and financial resources. Operational and procurement budgets are unlikely to be increased as governments around the world face revenue shortfalls due to the economic impact of measures to curb the spread of Covid-19. At the same time, spending priorities have already shifted towards the health sector as well as economic recovery packages.

4. Recommendations

The previous chapters have provided a very broad overview over maritime security challenges in a pandemic environment. Considering the unprecedented nature as well as the global impact of Covid-19 which remained ongoing at the time of writing in November 2020, it is far too early to assess the longer-term implications of the pandemic in relation to maritime security challenges and threats around the world. Nevertheless, it is possible to identify at least some key recommendations already.

First and foremost, it is vital to establish or update contingency plans to be better prepared for the next emergency. While it is unlikely that this is yet another pandemic, the Covid-19 situation provides various lessons. However, learning from a crisis requires a structured approach. Ideally, the necessary arrangements are already institutionalised. If such mechanisms are not in place, it is now time to identify and implement them.

When it comes to contingency management, there is no one size fits all approach. Contingency plans differ from one organisation to another, depending on a broad range of factors. Furthermore, even if contingency plans exist, decisionmakers have to be continuously trained and tested to guarantee an efficient crisis response. Merely having a plan in place does not guarantee a successful response to any type of emergency, knowing that the biggest mistake in any crisis is simply not to act at all.

Another aspect, which is particularly noteworthy for naval planners trying to cope with an increasing workload, are cooperations with other agencies and organisations, allowing for an increased focus on core tasks. Analysts, for example, can benefit from close collaboration with partners such as other government agencies, non-governmental organisations or private companies to gain access to additional data and information, especially related to topics or regions where the available internal expertise is limited. Other opportunities should be realised as well. That may even include actual operations conducted in cooperation between navies and non-governmental organisations which have been carried out in some countries already[13].

Finally, it is vital for navies and other maritime agencies to embrace innovative solutions as well as new and emerging technology. Aside from cooperating with non-traditional partners as mentioned above, technological development provides ample opportunities. Surveillance at sea, for example, traditionally involves maritime patrol aircraft, yet many tasks can also be carried out by using much cheaper unmanned aerial vehicles (UAVs). For some countries, more extensive use of UAVs could open up financial resources for other tasks. In other cases, navies can actually develop their surveillance capacities at a fraction of the costs for procuring and operating patrol aircraft.

Technology can also enable better analysis to support operational planning. For example, tracking commercial vessels is – in some cases – already supported by specific software and even artificial intelligence. Based on these systems, law enforcement efforts at sea can be pinpointed and target individual ships for specific reasons such as environmental offenses or sanctions violations.

[13] Sea Shepherd's partnerships with several African governments are a good example for such non-traditional cooperations: "Partnership with African Coastal States to Eradicate IUU Fishing in their Sovereign Waters by 2020", *United Nations Ocean Conference*, accessed 2 January 2021, https://oceanconference.un.org/commitments/?id=17190.

The maritime security strategy –analysis on using maritime autonomous systems for undersea challenges

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1. Introduction

The Covid-19 pandemic has created a series of complex, interconnected challenges for political and military decision-makers at all levels, including many that are related to maritime security. Structural challenges posed by the pandemic to the international maritime community require a comprehensive response, which must also include the prospect of detailed mapping of security challenges around the world.

Modern conflicts, post-Cold War and those that foreshadow a new world order, asymmetric and multirole, open new directions for conceptualizing the approach and use of the military as an instrument. Political and military leaders are learning how to face the challenges induced by accelerated dynamics of international relations as well as by the sustained advance of technology in the military field. Phrases such as military actions specific to hybrid warfare, cyber warfare threats, network-based warfare, or composite warfare have become 'global security environment parameters'. All this requires answers from a constantly changing reality. Even if in the future the nature of conflict will not be marked by substantial changes, the character of a conflict will be inextricably linked to the trend sustained by the technological evolution of the defence industry. Doctrines, tactics and procedures at each military level will change in correlation with the advance represented by technological development.

Those who will be able to adapt more quickly to the pace of change will be able to secure access to resources and benefits in terms of international relations. Moreover, military conflict may take place in the grey areas of uncertainty, where threats will have incongruous forms. Adaptability, flexibility and a comprehensive approach to the meanings and ways of a complex and unstable security environment at the interstate level will be the levers through which an optimal level of achievement of the operational capacity of military forces can be reached.

With the increase of asymmetric threats in coastal and littoral areas, naval capabilities of many states have been upgraded by the development and introduction of autonomous underwater vehicles. More and more countries have realized that they can improve their naval capabilities at a low cost, which is extremely important in the face of limited defence budgets. Accelerated technological development in this field has enabled these systems to

carry out a wide range of missions, such as actions to combat mines, gathering information, carrying out surveillance and recognizing targets in the area of interest, as well as targeting of submarines.

Future conflicts are likely to be defined by the specifics of information tools and will be increasingly characterized by IT support in various areas. These will be, to an overwhelming extent, asymmetric in nature, considering actions against atypical and non-traditional forces and means. Classic military confrontations will be combined with informational ones and disproportionate in terms of the technological potential between the combatants. Those who are able to obtain the first critical information, and to analyse and disseminate the data quickly among their own target groups, will have the initiative and can obtain decisive advantages. Such actions will not be possible without a comprehensive C4ISR infrastructure.

2. Theoretical framework of the new maritime security approach

The concept of maritime security, from the perspective of a more comprehensive approach, has its origins in international law aimed at ensuring freedom of navigation, and on interrelationships with other areas of international law related to globalization and the resilience of maritime states to symmetrical and asymmetrical threats. Maritime security cannot be achieved without a sustainable framework for monitoring, gathering and processing information, and predetermined reactions in case of possible scenarios. These reactions are based on diverse instruments and on several levels of the national Defense system and – from an integrated perspective – at the international level. This complex mechanism must work in a 24/7 operational cycle, in a robust, flexible manner and in accordance with sound defence planning. From the perspective of the navy, this complex framework implies the existence and use of credible and efficient capabilities, both in coastal areas (especially around ports and coastal infrastructure) and outside of territorial waters, covering the exclusive economic zone, the continental shelf and even the shores of states bordering the maritime area of interests.

Analyzing the level of unconventional threats, as an intrinsic part of maritime security, we observe an accelerated development of maritime cyber security. This concept refers to 'all measures to protect computers and computer networks that are operated from ships, maritime terminals, ports, as part of critical maritime infrastructure or as independent terminals related to commercial or military maritime activity'[1]. If by maritime domain we mean 'the entire space and all the infrastructure above the water, underwater, adjacent to the oceans, seas or sea lanes, including activities related to the port area, population, goods, naval transport platforms, military or commercial'[2], we can have a complete picture of the responsibilities

[1] Department of Homeland Security, *National Plan to Achieve Maritime Domain Awareness for the National Strategy for Maritime Security*, https://www.dhs.gov/sites/default/files/publications.
[2] Danielle Bivens, *Maritime Governance: Designed with security in mind,* Coast Guard Proceedings 71, no. 4 (2014–2015), http://uscgproceedings.epubxp.com/i/436751-win-2015.

of maritime states. Navies are generally the primary instruments to ensure maritime security, including in the field of maritime cyber security, but also to quantify unconventional threats and their impact on a broad spectrum of security matters. As a consequence, maritime cyber resilience describes the ability of the maritime community to recover from a cyber-attack.

It is increasingly clear that information technology has a considerable impact on the conduct of operations at sea. This phenomenon is visible when we analyse the concept of sea control. In the information age, efforts to achieve control of the sea must be concerted from the outset with actions to achieve information superiority or block access to information for the opponent. Thus, this phase becomes an integral part at the operational level. Autonomous underwater systems allow us to achieve informational superiority through their ability to process data and create options for action, providing technical support for collecting, processing and disseminating information in a permanent flow, while capitalizing on enemy vulnerabilities or blocking access to information at the same time. There is at least some interdependence between obtaining control of the sea and control of the information space.

Assertion and consolidation of cyberspace means that the conceptual boundaries of war merge in an area characterized by instability and uncertainty. As a consequence, we notice a compression of the time factor. This effect occurs as a result of the ability of robotic systems to collect, evaluate, merge, use, transmit, and transfer large amounts of data at higher speeds and to multiple users at the operational and tactical levels.

The concept of ISR operations comprises a wide range of missions, mainly focused on gathering mission-critical information. The scope is valid in times of peace, crisis or military conflict. Autonomous underwater vehicles (AUVs) offer a unique capability for ISR missions, mainly due to their small dimensions, ability to perform tactical manoeuvring in secret and the low risks associated with this equipment. For example, a comparative analysis between AUVs and submarines for the ISR domain in coastal areas shows that major disadvantages of using submarines are: tactical constraints due to shallow depths and the susceptibility to be detected in a hostile environment. AUVs are useful as a force multiplier and to expand the capabilities of current naval platforms. Feasible missions in support of maritime security operations include: coastal surveillance, interception and interpretation of electromagnetic emissions, mapping of navigation facilities, or obtaining information on the navigation regime of ports.

The modernization of capabilities in the navy, along with the use of autonomous underwater, air or sea-based systems, opens new opportunities to strengthen a credible force, based on the requirements of modern warfare, with an emphasis on increasing platform manoeuvrability, shorter decision-making, flexibility in organizing forces and applying the concept of network-based warfare, by using communication systems as part of C4ISR systems. The experience of naval conflicts in recent years, as well as the modelling of military actions in relation to technological development and the introduction of artificial

intelligence (AI) in the tactical field, lead to a paradigm shift, namely an increasing importance of technological and informational domination in the field. Autonomous systems are tools that can project military conflicts over a multidimensional space, allowing for strategic manoeuvring without the need to deploy forces or a large number of ships, submarines and aircraft.

When analysing actions to disrupt critical infrastructure or neutralize adversary capabilities, the aim should be to identify likely situations and how they interact with specific environmental factors. When initiating the process of analysing causes of a type of military conflict (or crisis), it is necessary to address how they can be prevented. Finally, the rationale for some directions of action must be a sum of systemic components and interdependencies between them. At the stage of identifying the causality for a military situation or military action, the establishment of directions of action can only be made based on the integrity of specific systemic components and interdependencies between them. In the typology of hybrid actions, possible enemies can be identified both among states and transnational organizations or entities. A hostile entity can use instruments from a spectrum of – conventional and unconventional – actions. Symmetric approaches pose challenges to the role of traditional military structures, for example when it comes to critical infrastructure protection.

The concept of hybrid actions represents a new type of threat, leading to a series of challenges in terms of doctrinal approaches. The centre of gravity of these actions translates into accelerated dynamics to a troubled area where we identify many non-military factors. In this situation, we consider scenarios in which actions of military forces must be adapted to composite (heterogeneous) crisis situations. From this perspective, naval forces need capabilities to control their areas of responsibility and to establish secure conditions for the use of critical infrastructure.

Planning and implementation of specific measures to secure critical infrastructure, or elements of it, cannot be achieved without an integrated understanding of the role of the military in ensuring vital functions of society. Fundamental elements should be the cooperation at inter-institutional level, more precisely the existence of viable memoranda or cooperation plans, validated within simulated scenarios. Critical maritime infrastructures, integrity of the objectives, continuity of activities and operational processes, and maintenance of operating capacities within established parameters must be taken into account.

Starting from scenarios regarding the protection of critical infrastructure in the maritime environment (including the underwater component), we identified vulnerabilities that could trigger potential crises, with a high probability regarding the occurrence of a major event with multiple implications. The development of scenarios is an important component in identifying optimal measures to achieve a balance of internal security. Disregarding the

security profile of a particular infrastructure category, possible threat scenarios are the main method to determine the security level of critical infrastructure. This approach is achievable by knowing the role, determining operating mechanisms, and identifying specific capabilities of critical infrastructure. In this sense, the mere determination of a scenario containing possible threats is not the final point in the process of protecting critical infrastructure, but rather is the element of triggering and establishing the protection plan.

As this plan develops, the demarcation between the general framework and the operational approach specific to the typology of critical infrastructure analysed can also be identified. In the most plausible scenario, actions to undermine the political stability of a state are initiated in the area of security factors and the area of critical infrastructure. Starting from the multilateral nature of the area of operations, the main direction we have identified for the future development of actions under the spectrum of hybrid warfare, in the area of critical infrastructure, is represented by the development of actions to counteract non-military threats. This includes industrial accidents, natural disasters or destructive actions by paramilitary groups. The multidimensional nature of these challenges automatically implies a redefinition of the vision of military forces and a re-establishment of the rules on their use.

Carrying out a military intervention, with the aim of removing the consequences of an incident targeting critical infrastructure, requires specific technical capabilities and adequate training in this direction. Commercial ports and naval bases represent potential targets for hybrid actions; the history of terrorist actions also includes actions carried out in maritime and port areas. The location of port facilities in the vicinity of densely populated areas is a major risk factor in the event of terrorist attacks. In a scenario where such an attack is successful, negative implications spread to several areas: economic, social, health, financial and security. Ensuring the security of critical infrastructure, such as port facilities, is related to the vitality of economic activity at national and international level.

Port infrastructure has a number of vulnerabilities: the structure and quality of personnel, the content of transited goods, the terrestrial perimeter of land-based facilities and the way of ensuring its supervision, inner and outer harbours, operating berths and various other areas. Port security cannot be achieved by an individual system, but by a system of measures to achieve the overall objective of reducing and eliminating risks in an integrated and comprehensive framework.

These systems can be the structured answer to a problem of determining the most effective arrangement that can be used across a wide range of scenarios. In support of the above, it is fundamental to realize the most probable typology of an asymmetric threat and to model and simulate this threat. The next sequence must be the introduction of a more complex scenario of own forces and means, but also of infrastructure elements, to determine the effectiveness on protection of force and the reduction or neutralization of threats in the maritime space.

3. Further steps to acknowledge maritime security challenges

At the conceptual level, the issue of security highlights connections between systems in several areas, such as military, economic, infrastructure, social and information. The approach we propose regarding the use of autonomous systems from the perspective of risks and vulnerabilities regarding port infrastructure, is an analysis from the perspective of maritime security issues, but with ramifications to the areas listed above. Starting from the development and analysis of unfavourable scenarios, which could negatively affect elements of port infrastructure, we consider that actions in the field of hybrid warfare have a high probability of realization and development, given the evolution of the security environment.

In this sense, the development of autonomous maritime capabilities and their use meets the needs of modernizing military systems and openness to a new doctrinal approach to maritime security in the area of responsibility. From the perspective of new trends, the transformation of naval capabilities is an imperative in terms of capacity revitalization. Technological developments in the military are advancing rapidly, opening new windows of opportunity to those who have the courage and determination to initiate a new systemic approach. The trident of technological advancement, globalization and scientific development has already created directions for the evolution of military action strategy and planning.

If we understand military transformation in terms of the continuous process of development and integration of new principles, tactics, doctrines, strategies and capabilities, aimed at increasing efficiency and interoperability of forces, we will see many similarities with ongoing processes inside NATO. At this moment, NATO is recalibrating at the doctrinal and technological level to reposition and revalidate the military factor as the main option to manifest the credibility of the organization. The main sectors of application of the transformation at the level of the alliance are personnel field management and projections based on programmes, delimitations at the level of doctrines, structure and organization of forces and capabilities, information gathering and processing activities, training, and military procurement. Thus, we can identify technological transformation as one of the elements of the transformation process. New technologies will not only become catalysts for organizational change but are the result of change.

Achieving informational superiority that these systems can achieve in a short time, compared to classical means, is the way to generate power by concentrating in an information network of sensors, decision makers and executors, to manage the area of operations, reduce downtime reaction in the decision chain, accelerating the pace of operations, intensifying lethal or non-lethal effects as appropriate, achieving protection and the planned effects. At the operational and tactical level, this involves the combination of kinetic and non-kinetic means to create those planned effects that contribute to achieving the objectives of military operations.

The fundamental maritime interests of a nation are supported by specific instruments of maritime security policy. This security policy is an integral part of a state's policy and consists of principles, norms, measures and actions that each state promotes to defend its fundamental interests. In the context of current changes, modern navies have understood that conventional military actions have an increasingly visible overlap with non-military actions, so that the development of tools to counter asymmetric threats has become a priority.

Information is a critical element for politico-military decision makers, both in terms of support provided in the decision-making process, and in terms of conducting operations. Maritime surveillance is one of the pillars on which naval operations are based, especially in the case of fleets with low potential, mainly for control in the area of responsibility or in the area of interest which cannot be fully controlled. As the technical performance of equipment evolves, or new surveillance systems (autonomous systems) emerge, the emphasis shifts to successive surveillance alignments, mainly through electronic surveillance. The analysis at operational and strategic levels offers the image of a disproportion between military efforts and the low efficiency in relation to the accomplishment of surveillance as part of maritime security.

Ensuring maritime security is a critical requirement and can only be achieved by modelling and achieving capabilities to neutralize threats on or under the sea. Among the categories of threats, we can mention ships, small fast boats, submarines, autonomous underwater systems operated by an enemy, divers, devices or explosive underwater charges.

The new concept of using autonomous underwater systems envisages a modular approach, closely correlated with threats in the area of operations, e.g. mine countermeasures, force protection, anti-terrorist actions, maritime surveillance, actions against surface targets or anti-submarine action in shallow waters. This concept allows for a flexible configuration of equipment and implicitly of the combat payload that can be integrated on autonomous submarine platforms. The accelerated development of technologies for production and use of unmanned underwater vehicles will substantially change the tactics and doctrine of conducting military operations at sea. The concepts, tactics and doctrines of naval combat are changing as the increase of autonomous underwater systems has gained momentum. This unconventional and innovative equipment is not only a multiplier in the execution of missions with existing conventional equipment but also a critical point, represented by the introduction of a number of sensitive issues for further development. It limits the human factor to achieve risk reduction, reduces mission costs, and diversifies the spectrum of special operations.

Systematic actions are characterized by a sustained logistical effort, a high usage of equipment, the erosion of troop morale due to the routine applied over long periods and the associated risk of such missions during which the threat is pervasive. The introduction of autonomous underwater systems also acts to reduce risks to combat personnel, to stop

negative effects that cyclic actions have on human operators and to achieve greater efficiency compared to traditional naval platforms. In this way, unmanned underwater vehicles make a substantial contribution to avoid surprise. By planning in advance and using autonomous systems, the occupation of favourable positions towards the opponent is possible, thus blocking his attempts to achieve the surprise. Autonomous underwater systems have the technical ability to improve the safety of own forces through systematic surveillance and warning, but also through direct defence of the maritime area or the operational disposition of maritime forces.

The planning of systematic actions in the maritime domain within defensive operations must respond to threats from the air, from the surface and from underwater. For this reason, systematic actions are classified into air hazard protection, submarine protection, protection against sea mines and protection against surface ships. The integrated performance of all systematic defence measures is the key to success in preventing surprising actions by opponent forces.

4. Conclusion

From the perspective of maritime security, the Covid-19 pandemic has shown that the preparation and response of naval forces related to biosecurity threats must be more robust, systematic and based on scenarios in which the approach to war at sea takes on other dimensions. The rapid spread of the pandemic has forced military decision makers to fundamentally adjust their concepts and doctrines on maritime security and the tools to carry out specific missions. The realities generated by the pandemic have led to approaches in the field of unconventional actions regarding the readiness of the military to act in times of health crisis. Thus, the acceleration of the introduction of autonomous systems to the entire sphere of missions represents well-defined future directions.

The success of operating autonomous systems depends not only on their technological development, but also on the typology of organizational structures, adjustment of specific concepts and normative acts on validation of new force structures, implementation and acceptance by the military system of a dominant culture oriented towards the perspective of accelerated technological developments towards changing operational paradigms and of updating tactics. The unanimously accepted conclusion regarding autonomous systems is that the main benefit of their use is the elimination of personnel from the fighting area in routine activities and the introduction of robotic systems with much higher endurance. With regard to autonomous systems and technological developments, this robotic equipment must be viewed and analysed through the complementary nature that it can provide in the operational field. It increases capabilities to achieve objectives set for a given mission.

As demonstrated above, autonomous underwater vehicles provide viable complementary capabilities to existing military platforms, and represent a feasible evolution for the expansion of their missions. The underwater threat is substantially mitigated by the combined use of warships, specialized aircraft and autonomous underwater systems. Analysing from the perspective of military technological developments, we can say that unmanned underwater vehicles are systemic pillars of an efficient and effective approach to maritime security, in the medium and long term.

The major effect and measures imposed by Covid-19 on maritime capabilities must be analysed in terms of risks and vulnerabilities that a pandemic poses to the challenges of the future and provide guidance for military decision makers. Consequently, it is clear that navies need to accelerate the introduction and use of autonomous maritime systems. From our perspective, a reassessment of the development of new autonomous systems and the availability of new resources is required, as well as an optimal analysis of naval capabilities that can quickly and efficiently develop a credible response to new maritime security threats.

In addition, as can be seen in the current context of insecurity generated by the consequences of the spread of Covid-19, identifying and preparing a robust response to maritime security issues requires a collaborative approach at the level of riparian states, not solitary action of a single state. The response must be one of international cooperation to harmonize specific approaches and achieve strategic flexibility.

A case study of the dispute in South China Sea: An approach by claimant countries and ASEAN and its impact on security in the region

Dr.Keiko Kono[1]

1. Introduction

Among multitudes of aspects of the dispute in the South China Sea[2], this article focuses on issues concerning what security challenges have been brought to Southeast Asia due to the dispute and how claimant and other concerned countries as well as ASEAN as a whole are managing to settle the dispute.[3] To that end, it briefly discusses how the dispute unfolded, in particular in relation to a legal proceeding at the arbitral tribunal brought by the Philippines. Currently, ASEAN is made up of ten member states; Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam. In respect of the dispute in the South China Sea, four ASEAN members are claimant states: Brunei, Vietnam, Malaysia and the Philippines.[4] Indonesia also has an interest in the dispute in a sense that its EEZ and continental shelf around the North Natuna Sea overlap with China's 'nine-dash line' at least in China's view, although it is not a claimant itself. In Indonesia's view, there is no legal basis for 'nine-dash line', and no overlapping between the two.[5]

[1] This piece has its origins in the Programme of Work 2019 assigned to myself at the NATO CCDCOE, part of which was published as "Strategic importance of, and dependence on, undersea cables" on the website of the NATO Cooperative Cyber Defence Centre of Excellence (CCDCOE) in 2019 (edited by Henrik Beckvard). Grateful acknowledgement is hereby made for the invaluable advice of Henrik Beckvard of NATO CCDCOE, who was the lead for the project, and Keishi Ono, Tomotaka Shoji, and Yu Harada, who are all researchers at the NIDS, the Japanese Ministry of Defense. The views expressed here are my own and do not necessarily represent those of the CCDCOE, the National Institute for Defense Studies (NIDS) or the Japanese Ministry of Defense.

[2] With regard to the brief history involving the dispute, see "South China Sea Territorial Disputes," The Peace Palace Library, https://www.peacepalacelibrary.nl/library-special/south-china-sea-territorial-disputes/

[3] The Association of Southeast Asian Nations (ASEAN) is a regional framework which was established in 1967 with a primary aim of accelerating economic growth, social progress and cultural development in the region through joint endeavours, and promoting regional peace and stability through abiding respect for justice and the rule of law (ASEAN Declaration (Bangkok Declaration), August 8, 1967, https://asean.org/the-asean-declaration-bangkok-declaration-bangkok-8-august-1967/

[4] This essay focuses on the Southeast Asian region and therefore doesn't discuss Taiwan's claim, although it is one of the claimants in relation to the dispute involving the South China Sea.

[5] "Indonesia Should be Wary of Beijing's South China Sea Proposals," *The Maritime Executive*, August 31, 2020,https://www.maritime-executive.com/editorials/indonesia-should-be-wary-of-beijing-s-south-china-sea-proposals

The South China Sea is known as an area with abundant natural resources including fish, oil and gas. Freedom of navigation in and overflight of the South China Sea is also a matter of vital importance to maritime powers, notably the United States. From the perspective of maritime powers and ASEAN coastal states, a large part of the South China Sea are considered as the high seas or as exclusive economic zones (EEZs) and continental shelf under the United Nations Convention on the Law of the Sea (UNCLOS).[6] However, China has been putting about 90% of the South China Sea under their de facto control, leading to friction with ASEAN nations. This piece presents an overview of the dispute in the South China Sea, focusing on how individual claimant states and ASEAN as a whole are reacting, and points to security threats that are emerging in the maritime and cyber domains respectively. Lastly, it deals with an issue of how countries concerned are affected by the Covid-19 situation and as a result whether they deal with the dispute differently than before the pandemic.

2. An Overview of the Dispute

The map in Figure 1 shows the competing claims by China and ASEAN nations. China claims territorial titles over the Spratly Islands, the Paracel Islands and the Scarborough Shoal in the South China Sea, and claims jurisdiction to the sea areas enclosed by the dotted red line, known as the 'nine-dash line.' Each coastal state also has competing territorial claims over these islands. The dotted lines in each color are the prospective EEZs claimed by coastal states, showing potential overlaps among ASEAN nations. However, this piece will not delve into the potential disputes among ASEAN coastal nations, but rather focus on the dispute between China and ASEAN nations.

Following discussions in the 1990s, ASEAN and China signed the Declaration on the Conduct of Parties in the South China Sea (DOC) in 2002.[7] In the document, ASEAN and China agreed to continue their consultations and dialogues to 'facilitate peaceful resolution of disputes among them' and set a goal of adopting a code of conduct in the South China Sea.

[6] Signed on 10 December 1982, came into effect on 16 November 1994. The United Nations Treaty Series, 1833: 3, https://treaties.un.org/pages/ViewDetailsIII.aspx?src=TREATY&mtdsg_no=XXI-6&chapter=21&Temp=mtdsg3&clang=_en#EndDec

[7] Declaration on the Conduct of Parties in the South China Sea, ASEAN, https://asean.org/?static_post=declaration-on-the-conduct-of-parties-in-the-south-china-sea-2

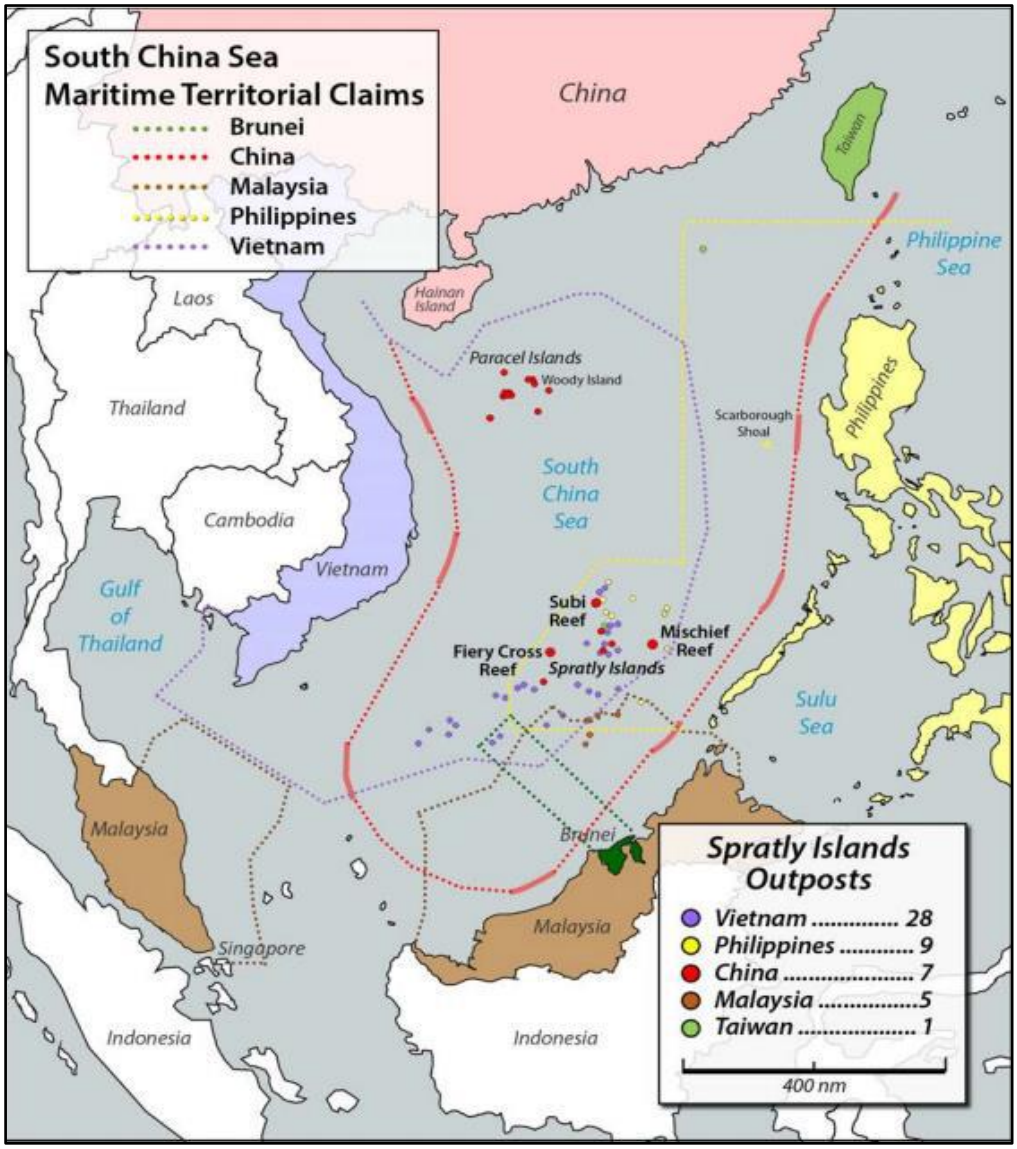

Figure 1: Maritime zones claimed by each claimant in the South China Sea[8]

The South China Sea Arbitration

Despite agreeing to the declaration, China's activities to unilaterally change the status quo and further advance its efforts to create a *fait accompli* in the area continued.[9] In 2013, the Philippines brought a judicial proceeding against China before an arbitral tribunal set up in accordance with ANNEX VII to UNCLOS. The arbitral tribunal in this instance is one 'means for the settlement of disputes concerning the interpretation or applications of' UNCLOS and is listed in the convention. Both countries are State Parties to UNCLOS.

[8] J. Michael Dahm, "Introduction to South China Sea Military Capability Studies," in idem., *South China Sea Military Capabilities Series: A Survey of Technologies and Capabilities on China's Military Outposts in the South China Sea* (Laurel, MD: The Johns Hopkins University Applied Physics Laboratory, 2020), 11, Appendix B, https://www.jhuapl.edu/Content/documents/IntroductiontoSCSMILCAPStudies.pdf

[9] Japanese Ministry of Defense, ed., *Defense of Japan* (Annual White Paper) (2020), 76-77, https://www.mod.go.jp/e/publ/w_paper/

The tribunal handed down its ruling in 2016, in which it rejected any legal basis for China's claimed historic rights over the waters. Below is a brief look at the ruling of the arbitral tribunal[10] where the entitlement to an EEZ or continental shelf generated by maritime features in the South China Sea was considered in the light of Article 121 of UNCLOS, which states:

> 1. An island is a naturally formed area of land, surrounded by water, which is above water at high tide.
> 2. Except as provided for in paragraph 3, the territorial sea, the contiguous zone, the exclusive economic zone and the continental shelf of an island are determined in accordance with the provisions of this Convention applicable to other land territory.
> 3. Rocks which cannot sustain human habitation or economic life of their own shall have no exclusive economic zone or continental shelf.

According to paragraphs 1 and 2, 'an island' could be used to determine maritime zones. However, as paragraph 3 stipulates, 'rocks' can only be used to determine the territorial sea and the contiguous zone, but not an EEZ or a continental shelf. The arbitral tribunal didn't recognize the existence of an island in legal terms in the Spratly Islands and Scarborough Shoal, favouring the Philippines' argument.[11]

As a result of the tribunal, China was not found to have any justification for its claim to an EEZ and a continental shelf in the South China Sea since it also rejected China's historic claim to the waters.[12] The tribunal concluded that China's activities infringed on the sovereign rights enjoyed by the Philippines in two occasions: Firstly, Chinese surveillance vessels 'acted directly to induce [a Singaporean flagged seismic survey vessel] to cease operations and to depart from an area that constitutes parts of the continental shelf of the Philippines' and thereby 'sought to carry out its own understanding of its rights' (which amounted to breach of Article 77 of UNCLOS).[13] Secondly, the fishing moratorium in the South China Sea that was announced by Chinese authorities on 10 May 2012 'constituted an assertion by China of jurisdiction' in the EEZ of the Philippines, thus amounting to breach of the sovereign rights of the Philippines under Article 56 of UNCLOS.[14] Besides, China's military and other activities in the area amounted to a breach of due regard, which China was supposed to have to the rights and duties of the coastal states under Article 58 (3) of UNCLOS.[15]

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[10] PCA Case Nº 2013-19, in the Matter of the South China Sea Arbitration before an Arbitral Tribunal Constituted under ANNEX VII to the 1982 United Nations Convention on the Law of the Sea between the Republic of Philippines and the People's Republic of China, July 12, 2016, Permanent Court of Arbitration, https://pca-cpa.org/en/cases/7/

[11] More specifically, Johnson Reef, Cuarteron Reef, Fiery Cross Reef, Gaven Reef (North), and McKennan Reef and any other high-tide features in Mischief Reef or Thomas were considered by the Tribunal to fall under "rocks" for purpose of Article 121 (3). Award, 259-260, paras. 643-646.

[12] Ibid., 117, para. 278.

[13] Ibid., 282, para. 708.

[14] Ibid., 284, para. 712.

[15] Ibid., 296, para. 753.

China called the ruling 'illegal, null and void'[16] and intensified its attempt to militarize the area, by deploying an aircraft carrier for military exercises. It also expanded its administrative districts to integrate two new islands under Sansha city in the southernmost province of China, both of which are located in the Paracel Islands[17], and amended a regulation regarding shipping between Hainan province and the Paracel Islands.[18] Chinese fishing vessels as well as coastguard and government survey ships continue to operate in the area.

In 2020, ASEAN coastal nations such the Philippines,[19] Vietnam,[20] Indonesia,[21] and Malaysia[22] individually sent letters of objections to the UN Secretary General[23] in response to a series of China's notes[24] addressed to the UN on the South China Sea. The US[25] and

[16] The State Council Information Office of the People's Republic of China, ed., White paper titled "China Adheres to the Position of Settling Through Negotiation the Relevant Disputes Between China and the Philippines in the South China Sea," July 13, 2016, para. 120, http://english.www.gov.cn/state_council/ministries/2016/07/13/content_281475392503075.htm; Statement of the Ministry of Foreign Affairs of the People's Republic of China on the Award of 12 July 2016 of the Arbitral Tribunal in the South China Sea Arbitration Established at the Request of the Republic of the Philippines, June 12, 2016, the website of Ministry of Foreign Affairs, the People's Republic of China, https://www.fmprc.gov.cn/nanhai/eng/snhwtlcwj_1/t1379492.htm

[17] "Beijing Moves to Strengthen Grip over Disputed South China Sea," *South China Morning Post*, April 18, 2020, https://www.scmp.com/news/china/diplomacy/article/3095550/south-china-sea-beijing-reclassifies-navigation-area-increase; The website of Hainan provincial government, http://www.ehainan.gov.cn/2020-03/25/c_121859.htm

[18] "South China Sea: Beijing Reclassifies Navigation Area to Increase Control, Experts Say," *South China Morning Post*, July 31, 2020, https://www.scmp.com/news/china/diplomacy/article/3095550/south-china-sea-beijing-reclassifies-navigation-area-increase

[19] The Philippines' Note Verbale No. 000191-2020 dated March 6, 2020, https://www.un.org/Depts/los/clcs_new/submissions_files/mys_12_12_2019/2020_03_06_PHL_NV_UN_001.pdf

[20] Vietnam's Note Verbale No. 22/HC-2020 dated March 30, 2020 (unofficial translation), https://www.un.org/Depts/los/clcs_new/submissions_files/mys_12_12_2019/VN20200330_ENG.pdf; Vo Ngoc Diep, "Vietnam's Note Verbale on the South China Sea," The Asia Maritime Transparency Initiative and The Center for Strategic and International Studies, May 5, 2020, https://amti.csis.org/vietnams-note-verbale-on-the-south-china-sea/

[21] Indonesia's Note Verbale No. 126/POL-703/V/20 dated May 26, 2020, https://www.un.org/Depts/los/clcs_new/submissions_files/mys_12_12_2019/2020_05_26_IDN_NV_UN_001_English.pdf and its Note Verbale No. 148/POL-703/VI/20 dated June 12, 2020 (unofficial translation), https://www.un.org/Depts/los/clcs_new/submissions_files/mys_12_12_2019/2020_06_12_IDN_NV_UN_002_ENG.pdf

[22] Malaysia's Note Verbale HA 26/20, dated July 29, 2020, https://www.un.org/Depts/los/clcs_new/submissions_files/mys_12_12_2019/2020_07_29_MYS_NV_UN_002_OLA-2020-00373.pdf

[23] "Indonesia Joins Neighbors in Protesting Beijing's Claims in South China Sea," *The Jalarta Post*, June 1, 2020, https://www.thejakartapost.com/news/2020/06/01/indonesia-joins-neighbors-in-protesting-beijings-claims-in-south-china-sea.html

[24] E.g. Note Verbales No. CML/14/2019 (December 12, 2019), No. CML/11/2020 (March 23, 2020), No. CML/42/2020 (April 17, 2020), No. CML/46/2020 (June 2, 2020) and No. CML/48/2020 (June 18, 2020).

[25] Letter from Ambassador Kelly Craft to Secretary-General António Guterres on South China Sea, June 1, 2020, https://usun.usmission.gov/protesting-chinas-unlawful-maritime-claims-at-the-un/

Australia[26] were on the same page in this regard. Moreover, experts predict that Vietnam, which claims sovereignty over the Paracel Islands and the Spratly Islands, will launch similar proceeding against China.[27]

Efforts by ASEAN As a Whole to Tackle the Dispute

To resolve the standoff, ASEAN has been making tireless efforts to conclude a legally binding Code of Conduct with China on that matter.[28] It is expected to be concluded by 2022.[29] In respect to the South China Sea, the ASEAN summit hosted by Vietnam on 26 June 2020 maintained its principal aspiration and concerns that had been expressed at the previous summit.

The chairman's statement of the 36th ASEAN summit[30] repeats the progress involving negotiating a Code of Conduct and emphasizes the importance of UNCLOS as an applicable law in the dispute in the South China Sea. However, the same document also expressed dissatisfaction over what China has been doing in the South China Sea. In particular, it states that 'the land reclamation, recent developments, activities, and serious incidents' may even 'undermine peace, security and stability in the region'.

Such new wording reminds of one incident that occurred about three months before the summit. On 2 April 2020, a Vietnamese vessel with eight crew members on board sunk after it collided with a Chinese coastguard ship near the Paracel Islands. Both countries blamed

[26] Australia's Note N° 20/026 dated July 23, 2020, https://www.un.org/depts/los/clcs_new/submissions_files/mys_12_12_2019/2020_07_23_AUS_NV_UN_001_OLA-2020-00373.pdf

[27] Mark J. Valencia, "Should Vietnam Take China To Arbitration Over the South China Sea?," *Lawfare*, August 18, 2020, https://www.lawfareblog.com/should-vietnam-take-china-arbitration-over-south-china-sea; Reportedly, the Vietnamese Ministry of Foreign Affair showed its vision on launching legal action on the website in 2014."TV Shows China Ship Ramming Another Vietnamese Vessel Near Oil Rig," *The Wall Street Journal*, June 3, 2014, https://www.wsj.com/articles/vietnam-tv-shows-chinese-vessel-ramming-another-ship-near-oil-rig-1401811550

[28] Tomotaka Shoji, "China's Formation of the Regional Order and ASEAN's Response: From 'Rise' to 'Centre'," in *NIDS China Security Report 2019: China's Strategy for Reshaping the Asian Order and Its Ramifications,* edited by NIDS (Tokyo: The Japan Times, 2019), chap. 2, http://www.nids.mod.go.jp/publication/chinareport/pdf/china_report_EN_web_2019_A02.pdf

[29] "ASEAN Targets Completion of Code of Conduct within Three Years," *CNN Philippines*, November 4, 2019, https://www.cnnphilippines.com/news/2019/11/4/asean-china-code-of-conduct-south-china-sea.html; See also 'ASEAN and China have been negotiating a code of conduct for the South China Sea, which they planned to conclude in 2021. But the prime minister said the pandemic has "disrupted and postponed the dialogue for building the COC."' "ASEAN Stresses Freedom of Overflight Above South China Sea," *Nikkei Asia Review*, June 26, 2020, https://asia.nikkei.com/Politics/International-relations/ASEAN-stresses-freedom-of-overflight-above-South-China-Sea

[30] Chairman's Statement of the 36th ASEAN Summit on June 26, 2020: Cohesive and Responsive, ASEAN, https://asean.org/chairmans-statement-36th-asean-summit-26-june-2020-cohesive-responsive-asean/

each other over the cause of the incident.[31] Even before the incident, Vietnam was known as the most hardline ASEAN nation against China.

ASEAN nations gathered at the 10th East Asia Summit (EAS) Foreign Ministers' meeting[32] and at the 27th ASEAN Regional Forum (ARF)[33] respectively in September 2020. Apart from more recent progress, they repeated key parts from the ASEAN summit's statement almost word by word in each document. The ministers appreciated efforts undertaken to negotiate the code of conduct in spite of the evolving pandemic situation. During a series of meetings, tit-for-tat exchanges between the US and China continued. US Secretary of State Mike Pompeo reportedly accused China of 'aggressive actions' in the South China Sea while Chinese State Councillor and Foreign Minister Wang Yi condemned the US by pronouncing that '[t]he United States has become the biggest driver of the militarization of the South China Sea and the most dangerous factor damaging peace in the area.'[34]

3. Security challenges posed by China in the South China Sea

As described above, most ASEAN coastal states concerned in the dispute are supporting the ruling by the arbitral tribunal. Nevertheless, China's efforts to exercise control over the South China Sea are ongoing and posing security challenges in both the maritime and cyber domains. Under international law, coastal states enjoy sovereign rights to exploit and explore natural resources in the EEZ and the continental shelf and every state has the right to freedom of navigation and or to conducting military activities on the high seas. However, as a consequence of China's *de facto* control over the area, coastal and other states have been prevented from exercising those rights.

Security threats in the maritime domain

In the maritime domain, an undersea surveillance network system also known as the "Undersea Great Wall" has been put in place in the South China Sea.[35] The project to

[31] "China Says Vietnamese Fishing Boat Rammed Coastguard Ship Before Sinking," *South China Morning Post*, April 4, 2020, https://www.scmp.com/news/china/military/article/3078452/china-says-vietnamese-fishing-boat-rammed-coastguard-ship

[32] The East Asia Summit (EAS) is the Indo-Pacific premier forum for strategic dialogue (website of Australian Department of Foreign Affairs and Trade, https://www.dfat.gov.au/international-relations/regional-architecture/eas/east-asia-summit-eas). Its member are ASEAN countries, Australia, China, India, Japan, New Zealand, Russia, South Korea, the US, totalling 18 countries.

[33] The ASEAN Regional Forum (ARF) is an important platform for security dialogue in the Indo-Pacific (website of Australian Department of Foreign Affairs and Trade, https://www.dfat.gov.au/international-relations/regional-architecture/asean-regional-forum-arf). Its member are ASEAN countries, and ASEAN dialogue partners (Australia, Canada, China, the European Union, India, Japan, New Zealand, South Korea, Russia and the US) and Bangladesh, Mongolia, North Korea, Pakistan, Sli Lanka, and Timor-Leste and one ASEAN observer, totalling 27 countries and entities.

[34] "U.S. Becoming Biggest Driver of Militarization in South China Sea: Chinese FM," September 9, 2020, *Xinhua*, http://www.xinhuanet.com/english/2020-09/09/c_139356446.htm

[35] Lyle J. Goldstein, "China's 'Undersea Great Wall'," *The National Interest*, May 16, 2016, https://nationalinterest.org/print/feature/chinas-undersea-great-wall-16222, in which the author explained the system as introduced seemingly without any concrete reference to the South China Sea, in a Chinese language

completely deploy the system by 2022 was announced in Chinese media in 2017.[36] It is mainly composed of two components. Floating platforms are equipped with electro-optical and infra-red sensor turrets, high frequency radio and cellular communication masts.[37] These are supplemented by an underwater acoustic surveillance network of fibre-optic cables connecting observation boxes and hydrophones.[38] The system is reported to be set up around islands and reefs to detect and repel foreign anti-submarine capabilities and protect China's Ballistic Missile Submarines (SSBNs). Outposts on reefs and islands provide crucial support to the system. Land reclamation on reefs and islands therefore plays a crucial role to enhance the system further.[39]

There is reason to believe that China has been using other means to engage in maritime surveillance activities inside and outside of the South China Sea. The BBC, for example, has reported that Chinese fishermen are hunting underwater drones in the South China Sea (see Figure 2).[40] These fishermen, however, are suspected to be a maritime militia and even belong to the military.

Figure 2 (1): Screengrab of a Chinese TV report on the drone findings by Chinese fishermen

journal titled China Ocean News (中国海洋报) in 2015. With regard to the system in the South China Sea, see Eli Huang, "China's Cable Strategy: Exploring Global Undersea Dominance" *The Strategist; The Australian Strategic Policy Institute (ASPI) Blog*, December 4, 2017, https://www.aspistrategist.org.au/chinas-cable-strategy-exploring-global-undersea-dominance/

[36] Tong Zhao, *Tides of Change: China's Nuclear Ballistic Missile Submarines and Strategic Stability* (Carnegie Endowment for International Peace, 2018), 56, https://carnegietsinghua.org/2018/10/24/tides-of-change-china-s-nuclear-ballistic-missile-submarines-and-strategic-stability-pub-77490

[37] H I Sutton, "China Builds Surveillance Network in South China Sea," *Forbes*, August 5, 2020, https://www.forbes.com/sites/hisutton/2020/08/05/china-builds-surveillance-network-in-international-waters-of-south-china-sea/?sh=75797ada74f3

[38] H I Sutton, "Good Wind ears: China's Underwater Great Wall," *Covert Shores*, May 27, 2018, http://www.hisutton.com/Cn_Underwater_Great_Wall.html

[39] Zhao, Tides of Change, 58.

[40] "Why Are Chinese Fishermen Finding So Many 'Submarine Spies'?," *BBC*, January 16, 2020, https://www.bbc.com/news/world-asia-china-51130644

Figure 2 (2): Chinese fishermen were awarded for finding "spy drones" (Source for both pictures: BBC[41])

In December 2016, there was a confrontation between the US and China following the seizure of an American unmanned underwater vehicle (UUV) by the PLA Navy. These UUVs are suspected of engaging in surveillance operations on undersea cables. The UUV was picked up outside the 'nine-dash line' but within the EEZ of the Philippines. China justified the seizure as a measure to 'prevent the device from causing harm to the safety of navigation and personnel of passing vessels.' On the contrary, the US accused China of 'unlawful' action, since the UUV was 'a sovereign immune vessel of the U.S. Navy' and was being used to 'carry out scientific research' and 'gather military oceanographic data such as salinity, water temperature, and sound speed.'[42]

Apart from an issue of the permissibility of operating a UUV in the EEZ of a coastal state, it can be assumed from the incident that China is trying to disturb other nations' military surveys and any other military activities in the area. The permissibility of military activities in the EEZ[43] is a controversial topic, in particular in relation to marine scientific research (MSR). Article 56(1) (b) (ii) of UNCLOS provides that a coastal state has jurisdiction with regard to MSR in an EEZ. However, UNCLOS does not define MSR. Certain coastal states like China insist that their jurisdiction covers not only MSR, but also any other military exercises and surveys,[44] and that other states must obtain a consent from the respective coastal state when they conduct MSR or any other military activities. However, such views are the minority.[45] Most Western nations clearly indicate the opposite position in their declarations to UNCLOS.

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[41] Ibid
[42] "United States Confronts China over Seizure of Unmanned Drone in the South China Sea," *American Journal of International Law*, 111, Issue 2 (2017): 513-517.
[43] See Raul (Pete) Pedrozo, "Preserving Navigational Rights and Freedoms: The Right to Conduct Military Activities in China's Exclusive Economic Zone," *Chinese Journal of International Law*, 9 (2010): 9-29.
[44] The number of Nations that restrict military activities in the EEZ is known as 29.
(1) Nations that restrict military activities in the EEZ: 19, (2) Nations that claim territorial waters in excess of 12-nm: 7, (3) Nations that claim security jurisdiction in their 24-nm contiguous zone: 5. Pedrozo, "Preserving Navigational Rights and Freedoms," 27; idem., "Military Activities in the Exclusive Economic Zone: East Asia Focus," *The U.S. Naval War College International Law Studies*, 90 (2014): 521-522.
[45] Pedrozo, "Preserving Navigational Rights and Freedoms," 27.

Hydrographic surveys are another example of debated concepts. Chinese scholars argue that these are similar to MSR and included therein. On the other hand, Professor/Captain Pedrozo (USN, Ret) explains hydrographic surveys as a US Navy Special Mission Program (SMP), and argues that it is distinct from MSR in terms of how data are used. Hydrographic surveys therefore belong to the freedom of the high seas and consent from a coastal state is not required in the EEZ.[46] Among ASEAN coastal states, several states including Indonesia, Malaysia and the Philippines do not admit that such rights exist in their EEZ.[47] Thus they might feel uncomfortable with Freedom of Navigation Operations (FONOPs) by the US, although their exercise of rights in the EEZ are severely affected by China's *de facto* control in the area.

Security threats in the cyber domain

China's effect on cyberspace in and outside the region is also significant. As shown in Figure 3, many undersea cables are crossing the South China Sea. They are an essential part of cyber physical infrastructures. *De facto* control over the area enables China to do whatever it wishes to these cables. The protection of undersea cables in the high seas is a long-standing issue, but cables laid in the South China Sea appear to be even more vulnerable due to China's military presence in the area. As shown in Figure 3, many cables have landing points in mainland China. Thus, China might not feel the need to tap cables underneath the waters. Still, China has the potential to compromise the integrity of telecommunication by tapping them and disrupting availability by damaging them.

When it comes to the protection of undersea cables from the perspective of international law, Article 113 of UNCLOS stipulates that in addition to the breaking or injury, 'conduct calculated or likely to result in such breaking or injury' (of a submarine cable beneath the high seas) need be punished under domestic law if it is 'liable to interrupt or obstruct […] communications.' Focusing on the latter part in particular, it can be admitted that a state 'would, for the first time, be able to act to *prevent* cable breaks from occurring.'[48] However, an intelligence operation on submarine cables may not be punished unless it meets the requirements set forth in Article 113 of UNCLOS, such as both physical effect (damage) on submarine cables and disruption of communication.

Article 113 allocates judicial (criminal) jurisdiction exclusively to the states of nationality of those having broken or injured a cable, and the flag state of the ship. On the other hand, coastal state and a state where telecommunications were disrupted due to damages to a submarine cable in the high seas, are not eligible to exercise judicial jurisdiction on the

[46] Pedrozo, "Preserving Navigational Rights and Freedoms," 14 and 22.
[47] *Maritime Claims Reference Manual*, the US Navy website, https://www.jag.navy.mil/organization/code_10_mcrm.htm
[48] Eric Wagner, "Submarine Cables and Protections Provided by the Law of the Sea," *Marine Policy*, 19, no. 2 (1995): 136.

crime.[49] It may cause a conundrum in a case where a submarine cable is operated by a consortium of companies, and each company is based in a different country. Therefore, in case of break or injury of cables occuring from Chinese vessels' activities, no ASEAN coastal nations are legally qualified to exercise the right of visit and search against the suspected ship. Besides, warships and other government ships enjoy complete sovereign immunity from jurisdiction in each maritime area under UNCLOS.

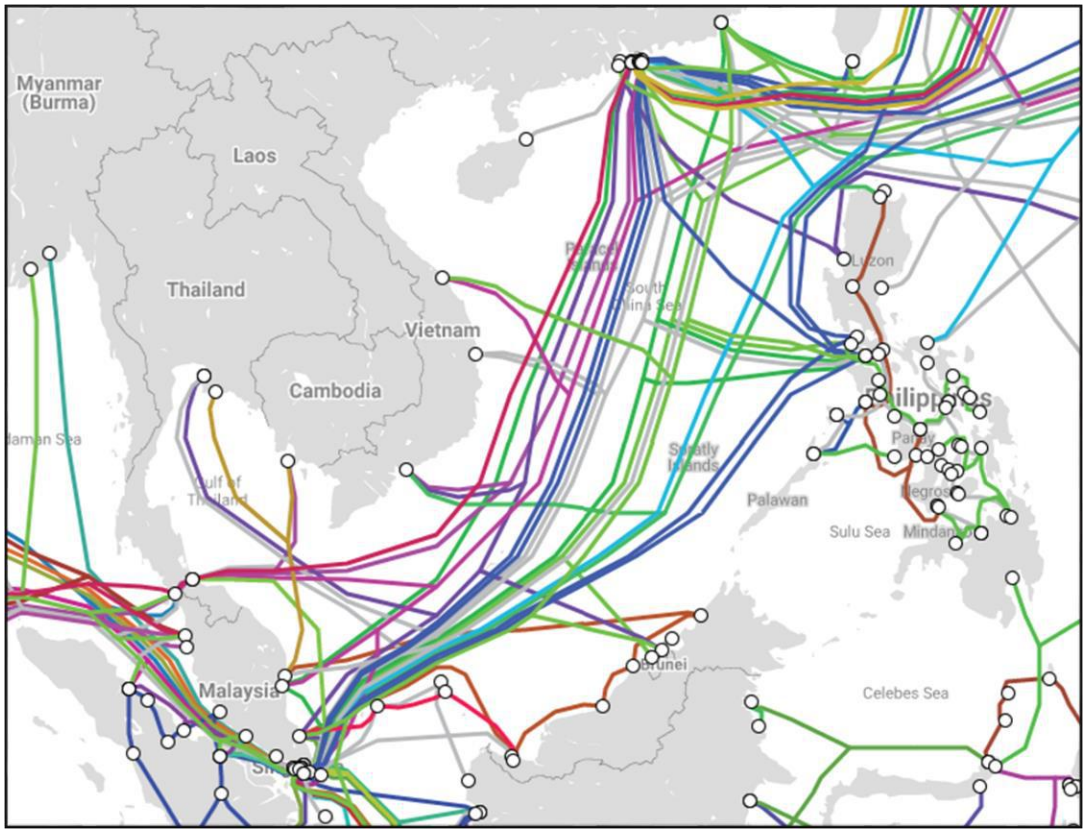

Figure 3: Undersea cables laid in the South China Sea (Source: TeleGeography[50])

Furthermore, China has been engaging on laying new undersea cables for exclusive use by Chinese military and civil government authorities, connecting islands and reefs in the South China Sea with the mainland, although these cables are not registered on open-source

[49] Tara Davenport, "Submarine Communications Cables and Law of the Sea: Problems in Law and Practice," *Ocean Development and International Law*, 43 (2012): 220. In this respect, the UNCLOS makes a contrast to High Seas Convention, which kept Article X of the Convention for the Protection of Submarine Telegraph Cables (signed on March 14, 1884, came into effect on May 1, 1888) alive by virtue of Article 30. Article X permits the right of visit by officers belonging to all High Contracting Parties, which is "a remarkable exception" to the exclusive jurisdiction of the flag State on the high seas. Wolff Heintschel von Heinegg, "Protecting Critical Submarine Cyber Infrastructure: Legal Status and Protection of Submarine Communications Cables Under International Law," in *Peacetime Regime for State Activities in Cyberspace: International Law, International Relations and Diplomacy*, edited by Katharina Ziolkowski (NATO CCD COE Publication, 2013), 299.
In respect of the original text of the Convention for the Protection of Submarine Telegraph Cables, see the International Cable Protection Committee website, https://www.iscpc.org/information/government-and-law/

[50] The map is available at https://www.submarinecablemap.com/

websites. In 2016, Woody Island in the Paracels was reportedly connected to the city of Hainan with undersea cables.[51] In the same year, the construction of undersea cables began for the first time in the Spratly Islands, starting with Fiery Cross, connecting to the mainland China and then it was completed with the remaining six reefs in the Spratly Islands in late 2017. Of particular note is the civilian nature of the undersea cables network in the Spratly Islands, undertaken by China Telecom. Still, such civilian networks are serving the demands of both civil government activities and military operations and operated in parallel to the PLA's own military network.[52]

A Chinese cable ship was spotted again around the Paracel Islands between 28 May and 6 June 2020 and was reported to have been engaging in laying new or repairing existing cables based on commercial satellite imagery of the Islands, which caused a protest from the Vietnamese government.[53] It has also been reported that satellite communication systems have been available with more than three dozen dishes constructed on islands and reefs in the Paracel Islands. Satellite communication is considered a complementary tool to undersea cables system and it is primarily enabling Chinese outposts in the area to communicate with ships, submarines, other maritime devices, and airplanes.[54]

4. Effects of Covid-19 on ASEAN Countries

This section briefly analyzes how Covid-19 has impacted ASEAN nations and the dispute in the South China Sea. There has been a negative effect on the process of negotiating the code of conduct due to the pandemic, as ASEAN was forced to postpone the dialogue.[55] However, it does not look like an end of the story. Overall, ASEAN nations are reportedly less affected by the pandemic, compared to other nations and regions. Vietnam, for example, is well aware of the lessons learned from the Severe Acute Respiratory Syndrome (SARS) epidemic that erupted in China in 2002 and carries out complete precautionary measures to suppress the outbreak.

[51] "China Works on Undersea Cables Between Paracel Island Outposts," *BenarNews*, June 8, 2020, https://www.benarnews.org/english/news/philippine/sea-cables-06082020165013.html. The original source was reported to be *Reuters*. E.g. "China Seeks Investment for Disputed *Islands*, to Launch Flights," *Reuters*, January 15, 2016, https://www.reuters.com/article/us-southchinasea-china-idUSKCN0UT0QR

[52] J. Michael Dahm, "Undersea Fiber-optic Cable and Satellite Communications," in idem., *South China Sea Military Capabilities Series: A Survey of Technologies and Capabilities on China's Military Outposts in the South China Sea* (Laurel, MD: The Johns Hopkins University Applied Physics Laboratory, 2020), 2-3 and 15, https://www.jhuapl.edu/Content/documents/UnderseaFiber-OpticCableandSATCOM.pdf

[53] "Vietnam Objects to China's Undersea Cable Construction in Paracel Island, " *ANI News*, June 13, 2020, https://www.aninews.in/news/world/asia/vietnam-objects-to-chinas-undersea-cable-construction-in-paracel-island20200613144630/

[54] Dahm, "Undersea Fiber-optic Cable and Satellite Communications," 4-18.

[55] "ASEAN Stresses Freedom of Overflight Above South China Sea".

On the other hand, the situation in Indonesia and the Philippines is worse, both countries rank in the top thirty across the world in terms of fatalities as of November 2020.[56] In this regard, China's 'mask diplomacy' or 'vaccine diplomacy' and other medical assistance are essential for these countries.[57] Filipino President Rodrigo Duterte was reported to have made a plea to China to gain access to vaccines and at the same time, to have told that he would not confront China over the dispute in the South China Sea.[58] It is remarkably contrasted with diplomatic protests lodged by the Philippines government in April 2020, regarding both China's new administrative districts in Hainan province and a maritime incident of 17 February involving naval vessels from China and the Philippines.[59] On the following day, The Chinese embassy in Manila released a music video, which sparked anger among the public in the Philippines, since the video recalled 'China's brazen disregard and aggressive lockout of the country's territorial rights over' the South China Sea among those who watched it, despite the song's reference to a joint effort of China and the Philippines on overcoming Covid-19.[60] It seems a battle against Covid-19 is prevailing over pushing against China in the dispute in the South China Sea.

Indonesia, Malaysia, Thailand, Cambodia and Laos are also listed as "priority" recipients of Chinese vaccines,[61] aside from other regions like South Asia and South America. It can be assumed that China's 'vaccine diplomacy' may have a favorable impact for China's approach on the South China Sea, in relation to these ASEAN countries.

For ASEAN nations, China remains the most important partner to turn to in terms of investment, infrastructure development as well as medical assistance, despite the dispute in the South China Sea, although ASEAN nations are welcoming an offer of financial and medical assistance from the US at the same time. As ASEAN nations hesitate to take sides with the US or China,[62] they seem likely to counterbalance China's already dominant position in the region with more and more assistance and involvement from the US and other nations.

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[56] The figure is based on a statistic as of November 2020 at COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU).
[57] "Vaccine Diplomacy Offers Risks and Rewards for Rising Superpower," *The Sydney Morning Herald*, October 11, 2020, https://www.smh.com.au/world/asia/vaccine-diplomacy-offers-risks-and-rewards-for-rising-superpower-20201007-p562zr.html
[58] "From Asia to Africa, China Promotes Its Vaccines to Win Friends," *The New York Times*, September 11, 2020, https://www.nytimes.com/2020/09/11/business/china-vaccine-diplomacy.html
[59] Renato Cruz de Castro, "Implications of the Recent Philippines-China Naval Stand-Off," The Asia Maritime Transparency Initiative and The Center for Strategic and International Studies, May 7, 2020, https://amti.csis.org/implications-of-the-recent-philippines-china-naval-stand-off/
[60] Mong Palatino, "China's COVID-19 Diplomacy Backfires in the Philippines," *The Diplomat*, May 9, 2020, https://thediplomat.com/2020/05/chinas-covid-19-diplomacy-backfires-in-the-philippines/
[61] "China's Covid-19 Vaccine Diplomacy Steals a March on US," *Financial Times*, October 21, 2020, https://www.ft.com/content/ce9a4c98-49b5-4c24-9ff2-ed1c6a3f3412
[62] Shoji, "China's Formation of the Regional Order and ASEAN's Responses: From 'Rise' to 'Centre'," 32-33; "Asia Summits Under War amid U.S.- China Friction," *Reuters*, September 16, 2020, https://www.reuters.com/article/asean-summit/asia-summits-under-way-amid-u-s-china-friction-idUSKBN2600KX

5. Conclusion

In light of the assessments above, three preliminary takeaways can be pointed out. First, China's *de facto* control over the South China Sea remains the same and is even intensifying for the time being. China has not abided by the ruling of the arbitral tribunal and will not listen to any complaints raised by individual ASEAN nations. Secondly, ASEAN as a whole plays a positive role in the dispute, as the conclusion of the code of conduct has been long discussed in ASEAN. Because of the pandemic, the process is being delayed, but ASEAN nations are considering reopening the process as soon as possible.

Finally, as a result of China's presence in the South China Sea, many security challenges remain in both the maritime and cyber domain. ASEAN coastal nations and maritime powers have been prevented from exercising their rights under UNCLOS and customary international law. However, the dispute in the South China Sea is only an aspect of issues on the agenda between China and ASEAN nations. China has a strong presence in the region in various ways including economic, medical and financial assistance amid the Covid-19 pandemic. Therefore, ASEAN nations are unlikely to escalate the dispute.

Advanced analysis and fusion systems for improved risk assessments at sea

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Orhan Ayran
HAVELSAN, Turkey

1. Introduction

Maritime transport is extensively used for recreational journeys, as well as for the transport of cargo or liquids, such as gasoline, chemicals, and oils. While it is less expensive to use marine transportation, maritime security is a crucial topic. In the first half of 2020, the IMB Piracy Reporting Centre[1] (PRC) reported 98 cases of piracy and armed robbery at sea, up from 78 in Q2 2019. Due to COVID-19 limitations on crew rotations and international travel, the threat of piracy adds to difficulties already faced by hundreds of thousands of seafarers employed outside their contractual periods.

The fundamental of a situational awareness and surveillance system involves the technologies and methods for determination and early warning of activities and anomalies in the region of interest. Hence, high-tech and modern products should be used for sensor systems and communication infrastructure to monitor wide maritime zones. In addition, advanced artificial intelligence (AI) and data analytics should be applied in central processing units for anomaly detection that can handle the intensive data flow.

Various forums have expressed the need for a range of auxiliary analytical instruments to increase maritime protection and maritime status understanding. There are many data sources while a ship is at sea; the Automatic Identification System (AIS) is arguably the best-known of these. In addition, the Safety of Life at Sea[2] (SOLAS) convention specifies further standards for ship construction, equipment, and operations.

HAVELSAN has focused on improving its maritime situational awareness and surveillance solutions using capabilities provided by advances in sensing and computing technologies. In this regard, HAVELSAN started the *Vessel Route Extraction and Anomaly Detection*[3] (VRAD) project. VRAD uses machine-learning algorithms and statistical methods to extract route patterns and detect anomalies. Several anomaly types are examined in the scope of the project. In addition, HAVELSAN applies to the European Union research and innovation programme *Horizon2020* with a project named *RouteAware*, which will serve as a

[1] International Maritime Bureau, [Online]. Available: https://www.icc-ccs.org/icc/imb
[2] S. Mankabady, The International Maritime Organization, Volume 1: International Shipping Rules, 1986.
[3] G. Boztepe, P. Karagoz, The Vessel Route Pattern Extraction And Anomaly Detection From Ais Data, 2019.

verification of applied solutions in real scenarios. *RouteAware* will apply a hybrid methodology combining analytical fusion and advanced AI algorithms to achieve an improved risk analysis. Data from AIS receivers, radars, electro-optical, and earth observation subsystems will be analytically associated and merged to obtain a clear tactical picture, while this merged data and other information sources will be analyzed by artificial intelligence aided methods to detect anomalies.

2. The VRAD project

Streaming data is much more than operators in the maritime domain can handle. Having a tool that captures and reports anomalies missed by operators will assist them. The analysis has also been arranged for this purpose.

NATO's *Centre for Maritime Research and Experimentation* has established a system called *Traffic Route Extraction for Anomaly Detection*[4] (TREAD). It is possible to extract maritime traffic routes using the AIS data clustering technique[5]. An object-based model that consists of vessel, waypoints, stationary, entry, exit and route objects forms the framework. By using the DBSCAN algorithm, all waypoint objects are shaped. Objects for the route were extracted from waypoint objects. For the qualification of extracted routes, entropy is used.

The artifacts of the vessel are derived from the AIS data stream and modified. The object of the vessel contains the ship's call sign, location, course over ground (COG) and speed over ground (SOG) and IMO number. To detect inputs in the selected bounding box, there is a vessel artifacts manager. The vessel object manager updates the descriptions and status of the vessels. There are two distinct conditions for the vessel, such as stationary and sailing. Waypoint artifacts are generated and modified by these events. A manager of stationary objects collects vessel objects that have a lower speed than the threshold provided. The stationary object manager often consists of stationary sites, such as offshore and port platforms. The DBSCAN[6] algorithm is used to cluster waypoints. DBSCAN has developed and modified clusters that shape artifacts based on their neighborhood density. In this study, the points that do not belong to any cluster are noise. Some waypoint forms are points for entry (EOs) and exit (EXs). To build and update according to the selected region, there are entry and exit point managers. The route objects can be extracted after clustering waypoints by linking two points.

[4] G. Pallotta, M. Vespe, and K. Bryan, Vessel pattern knowledge discovery from ais data: A framework for anomaly detection and route prediction

[5] G. Boztepe Karatas, P. Karagoz, O. Ayran, Trajectory Prediction for Maritime Vessels Using AIS Data, The 12th International Conference on Management of Digital EcoSystems (MEDES'20), Abu 2020.

[6] M. Ester, H.-P. Kriegel, J. Sander, and X. Xu, A density-based algorithm for discovering clusters in large spatial databases with noise, 1996.

The path objects manager produces and updates objects for the path. The manager tests his features for routes when a ship reaches the selected area. The vessel is added to the associated cluster if there is a path used by vessels with the same characteristics. Otherwise, to create a new path, the vessel is used. A detection number should be sufficient to enable the new path. Path objects are classified using derived historical path objects in order to forecast potential routes. Trajectory variations were also observed at the same time. A vessel is converted to a time vector that, in the current time window, contains the current vessel coordinates and the next SOG and COG co-ordinates. The current state has been correlated with the vector. These were combined as a series after position vectors were observed. The trajectory anomaly was observed when the sequence was different from the derived path. Entropy is used in the analysis to verify the accuracy of the predictions.

Roy[7] expresses the meanings of anomalies in the maritime domain. The kinds of anomalies and explanations in the research are focused on the Canadian military. During maritime navigation, enormous amounts of data are generated that operators cannot manage. Operators therefore have a need to automatically identify anomalies in navigation. Information representation for rule-based expert systems is the aim of the research. The research involves a review of aspects of information acquisition and perception and the creation of abnormal prototypes for detecting actions. Two distinct conceptions are risks and anomalies. Threats can be described as operations that jeopardize ownership. Anomalies, however, are explained as events that are not predominant habits. Anomalies may be defined as kinematic dynamic and non-kinematic dynamic anomalies.

First, it describes the Neighborhood Search Process. The algorithm is used for extracting routes. Later, two types of anomalies were investigated. The first is the dissimilarity of the routes extracted. Unusual stop trajectories in the open sea are the second anomaly.

In order to achieve an efficient result that is used to elicit existing route patterns, various kinds of classification methods have been experienced. Although the data includes AIS messages from the Mediterranean Sea, the coast of Europe is thick. There are 542153 AIS messages on the database. In addition, 503 unique ships exist. There are 20 types of vessels, although most of these vessels are different types of cargo ships.

Anomaly detection from existing routes is the major issue. Trajectories should be extracted initially to solve this problem. TREAD[8], the previous study, has been implemented. Then, 43 routes between two waypoints have been identified in the results of this edition and HAVELSAN has developed a new version of the algorithm which makes certain improvements.

[7] J. Roy, Anomaly detection in the maritime domain, 2008.
[8] G. Pallotta, M. Vespe, and K. Bryan. Traffic knowledge discovery from ais data. In 16th International Conference on Information Fusion, Istanbul, Turkey, 2013.

The first development is the calculation of bearings. With the new algorithm, 285 trajectories were made with the bearing calculation. As an enhancement, not only the calculation of bearings, but also interpolation was made. Missing AIS messages, have also been interpolated and then stopped after 10 attempts. Moving vessels in the timeline is another enhancement. In the given time interval, it has been verified for every ship whether it has a correct time stamp. In addition, the kNN clustering is applied to the course value of AIS messages that are at the initial waypoint in a 10 km radius. There are 334 routes with this version.

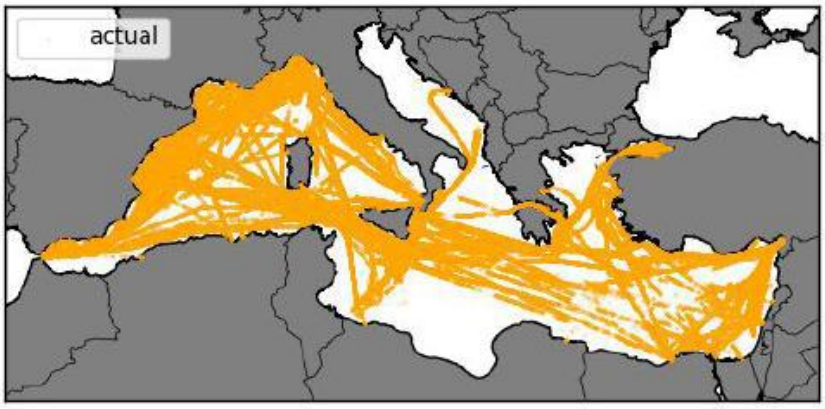

Figure 1: Projection of all AIS messages.

The anomaly detection was applied after the extraction process, measuring the similarity in the extracted trajectories to detect abnormal ship movements. To evaluate the similarity, LCS is applied. It uses the Haversine distance to match in a specified radius. The wider the radius is, the more matches are generated. Although the best results from the 100 km range have been obtained, 10 km provides an even better picture, the average similarity is 0.55 for this radius setting. AIS messages from both moving and non-moving ships are included in the test results. Stopping points lead to a lower similarity. Nevertheless, 0.55 is a decent result for test data that has never been used. This implies that to elicit high similarity scores, the extraction of existing routes should be continuous.

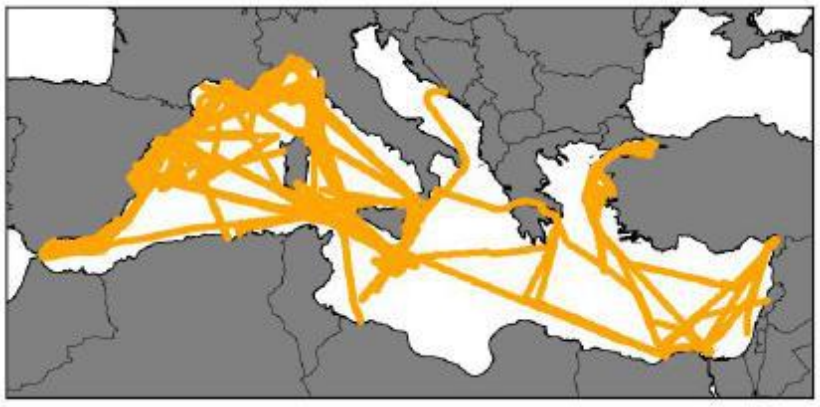

Figure 2: The Projection of Extracted Trajectories On The Map.

The unusual stop trajectories are being studied as another anomaly. These were discovered during the trajectory extraction. A different number of uncommon stop routes has three different extraction methods. The algorithm's simple version finds 68 routes. There are 77 trajectories in the bearing-calculated version. There are 375 unusual stop routes to the final edition. As a next step, to send a warning to the operator, the obtained sequences can be compared with these paths.

3. RouteAware

Organized crime, such as illicit trade, illegal fishing and the smuggling of goods and narcotics by sea, has become a problem that affects almost all countries. In addition, lax border protection poses a threat to state security as it provides a channel for terrorist groups and economic migrants to enter the country.

Several cross-border sectoral maritime awareness, surveillance and knowledge exchange systems are in place in the EU, such as SAFESEANET[9] for safety and security, EUROSUR[10] for border control, E-CUSTOMS[11] for customs, FLUX[12] for fisheries control, CECIS-COPERNICUS[13] for environmental protection, MARSUR[14] for defense, SIENA[15] for law enforcement, and the Schengen Security and Border Information System (SIS II)[16].

To provide situational awareness for maritime authorities, these devices combine different sensors to track the respective area of interest. Growing threats and the expansion of operational activities also contributed to an increase in the number of edge systems and diversity. There is a clear need for a structured and interoperable knowledge-sharing infrastructure, as the threats are international.

Although EU Member States are securing borders with a variety of systems and programmes, the security of the EU's external maritime borders still needs to be improved in terms of situational awareness and the capacity to cope with irregular migration,

[9] SAFESEANET [Online]. Available: http://www.emsa.europa.eu/ssn-main.html
[10] European Border Surveillance System (EUROSUR) [Online]. Available: https://ec.europa.eu/home-affairs/e-library/glossary/european-border-surveillance-system_en
[11] E-CUSTOMS: Electronic customs. [Online]. Available: https://ec.europa.eu/taxation_customs/general-information-customs/electronic-customs_en
[12] FLUX: Fisheries Language Universal eXchange [Online]. Available: https://www.unece.org/fileadmin/DAM/cefact/SustainableFisheriesTeamOfSpecialists/2018/FLUX-Brochure.pdf
[13] European civil protection and humanitarian aid operations [Online]. Available: https://ec.europa.eu/echo/what/civil-protection/mechanism_en
[14] MARSUR: Maritime Surveillance. [Online]. Available: https://www.eda.europa.eu/what-we-do/activities/activities-search/maritime-surveillance-(marsur)
[15] Secure information exchange network application (SIENA). [Online]. Available: https://www.europol.europa.eu/activities-services/services-support/information-exchange/secure-information-exchange-network-application-siena
[16] Second generation Schengen Information System [Online]. Available: https://ec.europa.eu/knowledge4policy/dataset/ds00009_en

smuggling of goods and drugs, or with illegal fishing. As such, data and comprehensive information collected from a wide range of connected services and systems should be interpreted and altered to provide maritime authorities with an essential and manageable picture. RouteAware brings expertise and state-of-the-art techniques from numerous fields into operation, such as maritime radar technologies, electro-optical surveillance systems, automatic identification systems, human/open source and signal intelligence systems, and secure communication networks that maintain interoperable systems/sensors, automated data fusion, and augmented reality.

The main objective of the RouteAware project is to establish an integrated maritime surveillance system for different types of components that are weakly interoperable, including new maritime sensor systems, existing maritime surveillance systems and operational centers. Via behavioral analysis and anomaly detection of vessels with modern artificial intelligence and big data analysis on real-time fused information, RouteAware improves situational awareness and reaction capacity of authorities. RouteAware provides a maritime tactical image and risk assessment through a layered dashboard enhanced with augmented / virtual reality.

The EU Maritime Security Strategy has released a guide covering the principles, needs and action plans for further developments in maritime surveillance systems for maritime stakeholders. Situational understanding and risk management guidelines for maritime surveillance systems in the EU are set out in these action plans. Activities and recommendations to reduce risks, improve preparedness and improve the efficiency of the maritime surveillance system will be applied to the RouteAware project.

Technologies and methods for the determination and early warning of events and anomalies in the area of interest shape the basis of a situational awareness and surveillance framework. In order to track large maritime areas, high-tech and modern products should also be used for sensor systems and communication networks. In addition, advanced artificial intelligence (AI) and data analytics can be used for anomaly detection in central processing units that can manage the intensive flow of data, increase detection and decrease false indications.

RouteAware will provide maritime authorities with an enhanced solution for vessel monitoring, behaviour analysis and automated anomaly detection to target illegal activities at maritime borders. Standalone subsystems such as the Maritime Radar Surveillance System (MRSS), the Electro-Optical Surveillance System (EOSS), including the Earth Observation System and the UAV Borne Electro-Optical System, the compilation of RF signals, the Open Source and Human Intelligence System (SIGINT / OSINT / HUMINT), and the Automatic Identification System (AIS) can identify events such as vessel traffic, vessel risk assessments and vessel kinematics.

As a hybrid approach incorporating both AI with active learning and systematic approaches for anomaly identification, RouteAware will carry out risk analysis and crisis management. RouteAware can use active learning, a special case of machine learning in which a learning algorithm interactively queries a user (or some other source of information) to mark new anomaly classes with common elements. There are cases, for example, in which unlabelled information is abundant, but manual labelling is costly. Learning algorithms will actively ask the user for labels in such a scenario. Since the learner selects and filters the examples, the number of examples for learning a concept may often be much smaller than the number needed in normal supervised learning. Big data analysis techniques will then fuse data from non-homogeneous sources and AI tools focused on active learning will extract anomalies by situational awareness data.

Methods and technology for RouteAware fusion and anomaly detection would substitute excessive labor and material costs for continuous monitoring of vulnerable regions through barely interoperable and manageable displays. In addition, analytical methods will be used to further analyze anomalies to extract the root cause and sequence of events to help strengthen the system with false alarm rates for detecting anomalies. Potential risk assessments and predictions would be based on the results of analytical analysis. The performance of anomaly detection, risk analysis and crisis management can be enhanced by a hybrid use of active learning and analytical methods. It would also include the underlying context and bring an anomaly to a more meaningful interpretation.

4. Conclusion

Vessel trajectories are already extracted in three different approaches. In the future, the route detection algorithms can be enhanced with streaming AIS messages. While the messages arrive, the algorithm improves. Furthermore, other types of anomalies can be inspected. For instance, meeting two or more vessels at the same point in the near future, not arriving at the destination port in arrival time, incompatibilities of speed and position information, incompatibilities of navigation status information and kinematic information, position and speed, very low speed value, unexplained high speed value anomalies can be studied in the future. In addition, it is possible to work with Bayesian Networks[17] for anomaly detection.

RouteAware offers a cloud-based solution for coast surveillance and anomaly detection that incorporates multiple sensors and provides maritime authorities and coastguards with real-time, merged and refined information. In order to monitor and control many forms of criminal activities at maritime borders, authorities would be able to use available information on user-friendly displays, providing an important contribution to maritime border security.

[17] N. Friedman, D. Geiger, and M. Goldszmidt, Bayesian network classifiers, Machine learning, vol. 29, no. 2-3, pp. 131–163, 1997.

Rising Temperatures, Rising Tensions, Rising Seas: How can navies serve their countries at the start of a transformative decade?

Sam Zwolinski

1. Introduction

There has been a trend of rising tensions between major global powers for many years. A rapidly growing China and an increasingly expansionist Russia have challenged American influence in the Middle East and elsewhere around the world. Other countries have become more assertive, and the election of Donald Trump has affected many smaller states' perceptions of the US. Rebalancing in the global economy has been a powerful force in this shift, which is ultimately defined by demand and supply as well as competition for resources. As the 21st century continues, this will increasingly become entangled with environmental struggles.

SARS-CoV-2 emerged against a backdrop of these long-term trends. Its spread has been affected by them, just as it has influenced great rivalries and energy demands. The world scrambled to procure protective supplies and equipment, providing a reminder of how much humanity relies on shipping. The United Nations Conference on Trade and Development's estimate that 80% of international trade is by sea proves how essential it is for countries to be able to protect their waters. Ensuring maritime security is therefore in everyone's interests, be they proponents of economic protectionism, frictionless free trade, or anything in between. To do so effectively, navies must not only equip, train and present themselves to protect their interests and maintain the rules-based international order, they will need to adapt their techniques to this 'new normal'.

2. Covid-19 overview

By September 2020, Covid-19 had officially claimed over one million lives[1]. More than a third of the world's population had been placed under lockdown for some length of time[2]. The ensuing global recession was the most severe since the Second World War[3]. The immediate damage to some sectors and businesses may be permanent, while the long-term consequences of over 90% of students having their education disrupted[4] are too vast and disparate to quantify.

[1] Emiliano Rodríguez Mega, "COVID has killed more than one million people. How many more will die?", Nature, 30 September 2020, https://www.nature.com/articles/d41586-020-02762-y
[2] Juliana Kaplan, Lauren Frias, Morgan McFall-Johnsen, "Our ongoing list of how countries are reopening, and which ones remain under lockdown", Business Insider, 14 March 2020, https://www.businessinsider.com.au/countries-on-lockdown-coronavirus-italy-2020-3.
[3] "COVID-19 to Plunge Global Economy into Worst Recession since World War II", The World Bank, 8 June 2020, https://www.worldbank.org/en/news/press-release/2020/06/08/covid-19-to-plunge-global-economy-into-worst-recession-since-world-war-ii
[4] "COVID-19 Impact on Education", United Nations Educational, Scientific and Cultural Organisation (UNESCO), last accessed 29 October 2020, https://en.unesco.org/covid19/educationresponse.

The commonly touted sentiment of "the virus doesn't discriminate" has been refuted thoroughly. Age and health conditions have an enormous effect on an individual's vulnerability to Covid-19. Other factors – including sex, race, profession, and living conditions – also lead to measurably different outcomes for different groups of people. These factors interact in complex ways that scientists are only beginning to understand. Ultimately, they mean that any two countries – even demographically similar ones – may be substantially more or less susceptible to the pandemic. Coupling this intrinsic quality of a population to their government's political response, the variation in how nations have coped can start to be understood. This paper will not attempt to explain why the outcome in Vietnam has been vastly different to that in Indonesia[5], or why the UK and Kazakhstan have seen broadly comparable official infection rates[6]. Rather, these points are raised to set the scene for how these outcomes will manifest in the maritime domain.

There is another, often unsaid, variable that can explain some of the variations. Errors in counting numbers of infections and deaths will inevitably be high with a novel virus. The UK Department of Health and Social Care faced criticism when a mistake as mundane as mismatched spreadsheet column numbers resulted in nearly 16,000 positive cases being unreported[7]. One must also consider active tampering of figures to save face, reassure domestic audiences, or compete with rival local officials. Leaks from the Iranian government[8] showed how severe data manipulation can be.

Owing to their narrow passageways, communal spaces, and confined working areas, warships are vulnerable to highly transmissible viruses. Moreover, SARS-CoV-2's frequency of asymptomatic infections means that containing cases on board is an overwhelming task, especially for visitors, contractors or detainees. Given this susceptibility, navies will face unique problems, so they will have to come up with unique solutions. Unemployment levels will weigh on the minds of potential recruits just as they will on commanding officers conducting anti-narcotics patrols. Social distancing will need to be considered by admirals overseeing training pipelines just as much as marines searching suspicious vessels. There are dozens of challenges sailors will encounter, and many more that are yet to be thought of.

[5] "The Coronavirus in Asia and ASEAN – Live Updates by Country", ASEAN Briefing, last accessed 20 August 2020, https://www.aseanbriefing.com/news/coronavirus-asia-asean-live-updates-by-country/
[6] "Countries where COVID-19 has spread", Worldometer, last accessed 21 August 2020, https://www.worldometers.info/coronavirus/countries-where-coronavirus-has-spread/
[7] "Covid: Test error 'should never have happened' – Hancock", BBC News, 5 October 2020, https://www.bbc.co.uk/news/uk-54422505
[8] "Coronavirus: Iran cover-up of deaths revealed by data leak", BBC News, 3 August 2020, https://www.bbc.co.uk/news/world-middle-east-53598965?intlink_from_url=https://www.bbc.co.uk/news/topics/cjnwl8q4ggwt/iran&link_location=live-reporting-story

The outbreak on the USS Theodore Roosevelt in March 2020 is proof of the dangers faced by sailors at sea. Believed to have originated from a port visit in Vietnam, the ship's crew sustained over one thousand cases and one fatality[9]. The availability of testing kits at the time, coupled with the risk factors mentioned above, meant that tracing the spread of infection and finding a safe place for the crew were significant challenges. Frictions between various levels of command led to a negative impact in reputation and morale, culminating in the removal of the commanding officer and the resignation of the Secretary of the Navy. A subsequent inquiry criticized decisions made regarding accommodating the crew[10], yet this does not provide definitive assurance that such a tragedy will not happen again. Restricting port visits would prevent a major route for the virus to embark on warships. At the same time, such restrictions would have a detrimental effect on international relations and morale.

3. Rising tensions

Before the coronavirus became a global pandemic, several other issues acted as catalysts for instability. The Freedom House annual 'Freedom in the World' report notes a broad trend of erosion of democratic norms and institutions since 2005. This decline has been widely reported and discussed, with mass manipulation of information enabled by technology being one of many explanations. Increasingly populist rhetoric around the world has led to the degradation of internationalist agreements, exemplified in President Donald Trump's 2018 withdrawal from the Iran nuclear deal. In fact, tensions between NATO states and Iran have been high for many years. Iran's nuclear programme, involvement in the Syrian and Yemeni civil wars, and use of proxy militias as foreign policy tools are key factors, in addition to sanctions applied by Western countries as a response to those actions.

The sea was the setting for many of 2019's geopolitical flashpoints. Prominent incidents involved the Royal Navy and the US Navy, as well as Iranian naval forces and their proxies. Some notable events are listed in the table below.

Date	Incident
13th June	Attacks on KOKUKA COURAGEOUS and FRONT ALTAIR
20th June	Iranian downing of US Navy unmanned aerial system (UAS)
4th July	Boarding of GRACE 1 (since renamed ADRIAN DARYA-1) off Gibraltar
10th July	Attempted Iranian seizure of BRITISH HERITAGE
18th July	USS BOXER's downing of an Iranian unmanned aerial system
19th July	Iranian seizure of STENA IMPERO in the Strait of Hormuz

[9] "COVID-19 pandemic on USS Theodore Roosevelt", Wikipedia, last accessed 30 December 2020, https://en.wikipedia.org/wiki/COVID-19_pandemic_on_USS_Theodore_Roosevelt

[10] Eric Schmitt and Thomas Gibbons-Neff, "Navy Inquiry Faults Two Top Officers Aboard Roosevelt for Handling of Virus", New York Times, 19 June 2020, https://www.nytimes.com/2020/06/19/us/politics/carrier-roosevelt-coronavirus-crozier.html?campaign_id=60&emc=edit_na_20200619&instance_id=0&nl=breaking-news&ref=cta&regi_id=16153474&segment_id=31381&user_id=e9848bda5d7546386411f6e2fbdaf95e

While none of the events listed directly resulted in the use of lethal force against a person, it is important not to understate the fact that two of the larger navies in the world engaged and destroyed each other's assets during peacetime. Moreover, the killing of the Iranian Revolutionary Guards Corps' Quds Force leader, Major General Qassem Soleimani, in January 2020 induced the sharpest escalation of tensions between Iran and the US in years, if not decades.

4. Oil markets

2020 has been a tumultuous year for the crude oil market. Near-sighted decisions on output levels led to oversupply which, in conjunction with the fall in demand following lockdowns, caused plummeting prices. While subsequent agreements on production cuts helped with stability, uncertainty and the glut in supply had driven prices to 18-year lows[11].

According to the Oxford Institute for Energy Studies (OIES), the surge in oil prices between 2003 and 2008 was at least in part due to speculative buying[12]. Defined as "buying crude oil for physical storage leading to an accumulation of oil inventories", this practice is most effective in times of low prices, whereupon speculators anticipate an uptick to seize and profit from. The extremely low prices in 2020 have led to many speculators storing oil in large tankers and biding their time. While not a new method in the world of oil futures, Forbes reported the daily rates for some very large crude carriers (VLCCs) increased well over seven-fold shortly before the first wave of Covid-19 struck Europe[13]. Open source data has been analysed to examine trends in crude oil tanker behaviour as April 2020, described by Bassam Fattouh and Andreas Economou of the OIES as "the bleakest month in the history of oil markets in terms of balances and prices", came and went.

Month	Petroleum tankers travelling through:	
	Suez Canal	Cape of Good Hope
Jan 20	289	271
Feb 20	279	292
Mar 20	284	288
Apr 20	338	334
May 20	306	355
Jun 20	222	314
Jul 20	205	373
Aug 20	192	329

[11] Thompson, "Low demand".
[12] Bassam Fattouh, Lutz Kilian, Lavan Mahadeva, "The Role of Speculation in Oil Markets: What Have We Learned So Far?", OIES, March 2012, https://www.oxfordenergy.org/wpcms/wp-content/uploads/2012/08/WPM-45.pdf
[13] Gaurav Sharma, "Supertanker Prices Spike By Nearly 678% On Oil Market War And Storage Plays", Forbes, 12 March 2020, https://www.forbes.com/sites/gauravsharma/2020/03/12/supertanker-prices-spike-by-nearly-678-as-oil-price-tanks/#28f8058c7e39

When prices are low, traders are not in a hurry to sell and the time to deliver oil to customers is not a variable that affects profitability. Hence, for a ship heading from the Middle East to Europe or the Americas, the Suez Canal (and its associated costs) becomes an unattractive route for tankers. The decline in usage of the Suez Canal was so pronounced that authorities reduced fees by up to 75% for ships travelling through[14].

Alternatively, the Cape of Good Hope is a slower and cheaper route between the Eastern and Western hemispheres. The intensity of tanker traffic around the cape and through the Suez Canal between 2018 and 2020 is shown in Figure 1. Total deadweight tonnage of tankers increased by around 20% between January and April.

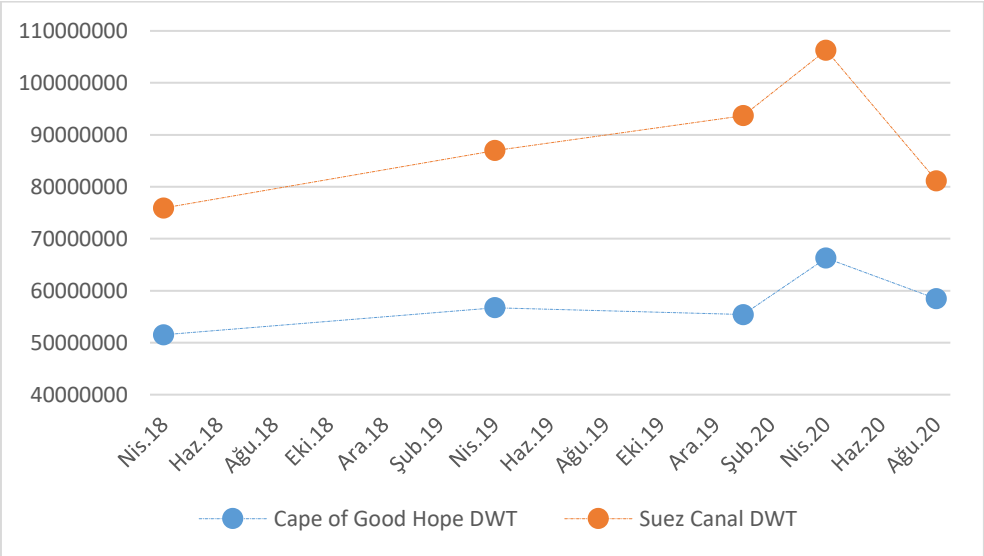

Figure 1: Maritime traffic around the Cape of Good Hope and through the Suez Canal, measures in deadweight tonnage (DWT).

Compared to the Suez Canal, the Cape of Good Hope exhibited a (proportionally) higher bump in traffic (as measured by DWT) and a less pronounced fall after lockdowns began easing in Western countries.

With the oceans busier than any point in history with speculatively procured oil, and demand slowly creeping up again, members of the Organization of the Petroleum Exporting Countries (OPEC) will be forced to make decisions on output rates that will determine their economic recoveries and the price of pre-extracted oil. From the perspective of malicious elements lacking the production capacity to influence global markets on their own, tankers used as floating storage may also represent attractive targets to create further instability and damage the recovery of rivals. Such factions include terrorist groups using mines or Improvised Explosive Devices (IEDs) or nations with deniable offensive capabilities.

[14] Sam Chambers, "Suez Canal drops fees to stem tide of ships heading via the Cape of Good Hope", Splash247.com, 1 May 2020, https://splash247.com/suez-canal-drops-fees-to-stem-tide-of-ships-heading-via-the-cape-of-good-hope/

Robust and persistent defences of these ships should be a prime concern for their owners and NATO nations seeking to preserve stability. Given that civilian satellites could be exploited by anyone with an internet connection to locate valuable targets, warships and military space-based sensors should act as a deterrent to any group considering executing an attack. The importance of oil tankers is further raised when considered in conjunction with other major trends. Increasingly populist and isolationist rhetoric from leaders could lead to reduced international cooperation and hoarding of resources. Regardless of politics and the exact unfolding of the pandemic over the coming months, the argument that economic and social health of much of the world depends on international shipping cannot be disputed.

OPEC's Annual Statistical Bulletin 2019 estimated that Venezuela owns over 20% of proven crude oil reserves, the single largest share. Yet in May 2020, the heavily sanctioned state was forced to import oil from Iran. A subsequent fuel shipment to Venezuela was confiscated by the US in August, under the justification that the transaction violated sanctions.[15] The US Department of Justice reported "Iran's navy forcibly boarded an unrelated ship in an apparent attempt to recover the seized petroleum, but was unsuccessful"[16]. This demonstrates how overlapping events have unique ramifications to navies in 2020. The culmination of several high-level trends with a global health (and economic) crisis means that senior leaders and commanders enforcing sanctions will also have to address the humanitarian consequences of confiscating oil cargoes in legally and strategically acceptable ways.

Even though the interaction described above did not escalate further, it was atypical for routine maritime security operations. Aside from high-level considerations, the pandemic introduces a novel set of challenges for commanders on the tactical level. Should similar encounters happen again, sailors on the front line will inevitably have to ask themselves:

- What is the risk that boarding a civilian ship will lead to Covid-19 being spread to my warship?
- How does the possible presence of coronavirus affect the calculation of proportional armament and posture of warships and boarding teams?
- Do standard boarding tactics apply in the context of a tanker being sent between two nation states?

With small-scale interactions between major players likely to occur again, decisionmakers on all sides should devise robust answers to the above questions.

[15] "US seizes millions of dollars of Iranian fuel bound for Venezuela", BBC News, 14 August 2020, https://www.bbc.co.uk/news/world-us-canada-53783179?intlink_from_url=https://www.bbc.co.uk/news/topics/cjnwl8q4ggwt/iran&link_location=live-reporting-story

[16] "Largest U.S. Seizure of Iranian Fuel from Four Tankers", US Department of Justice Office of Public Affairs, 14 August 2020, https://www.justice.gov/opa/pr/largest-us-seizure-iranian-fuel-four-tankers

5. Climate change & migration

Oil is indirectly involved in another of the 21st century's great challenges. Since the industrial revolution, humanity's consumption of fossil fuels has led to small but detectable changes in the earth's atmosphere that yield serious effects on the climate. NASA and the Intergovernmental Panel on Climate Change (IPCC) detail the scientific evidence and consequences of climate change[17], a small selection of which are listed below:

- Rising temperatures
- More droughts and heatwaves (which in turn lead to wildfires)
- Longer, stronger and more frequent hurricanes
- Rising sea levels

These problems will inevitably have an impact on how governments employ their navies. Like many others, the Royal Navy takes pride in supporting victims of natural disasters around the world. As the century progresses, and storms become more frequent and intense, it will be increasingly difficult to combine humanitarian operations and maritime security obligations. The challenge will be amplified as physical and economic effects of climate change – which disproportionately affect the world's poorest[18] – are likely to force many coastal industries to decline. This could in turn accelerate migration and increase the likelihood of people turning towards illegal activities.

Throughout 2020, much has been made in UK media of flows of migrants travelling through mainland Europe and across the English Channel. Images of rigid inflatable boats (RIBs) overfilled with people have been plentiful, as around 4000 people made the journey in the first eight months of the year. July even saw a tenfold increase compared to that of the previous year[19]. The Home Secretary called upon the Royal Navy to assist the civilian Border Force, which raised practical, legal and diplomatic questions. Given the gradual shift of the 'Overton Window'[20], and the intersection of widening inequalities due to climate change and Covid-19, such questions are likely to be asked more and more in the future. Navies find themselves being asked to prepare for major conflicts, protect maritime trade, deliver more humanitarian assistance, patrol more profitable smuggling routes, and support civilian authorities, all while the dangers to individual sailors are elevated.

[17] "The Effects of Climate Change, NASA, last accessed 30th October 2020, https://climate.nasa.gov/effects/
[18] Gabe Bullard, "See What Climate Change Means for the World's Poor", National Geographic, 1 December 2015 , https://www.nationalgeographic.com/news/2015/12/151201-datapoints-climate-change-poverty-agriculture/ .
[19] Jamie Grierson and Kim Willsher, "More than 4,000 have crossed Channel to UK in small boats this year", The Guardian, 9 August 2020, https://www.theguardian.com/uk-news/2020/aug/09/number-migrants-crossing-channel-uk-passes-4000-this-year
[20] "The Overton Window", Mackinac Centre For Public Policy, last accessed 30 October 2020, https://www.mackinac.org/OvertonWindow

6. Summary

The issues identified in this paper will be felt well into the 2020s, with some likely to persist far beyond the decade. To overcome them will demand investment, cooperation and leaders who follow and respect scientific evidence. In the context of maritime security, NATO navies will have to handle small scale flashpoints that will require adaptable tactics to be practised. While the economic crisis could fuel an increase in the trafficking of people and contraband, the health crisis will make interdicting them more dangerous.

Emerging technologies can be used to even the odds. Satellites can monitor potentially vulnerable oil tankers and dissuade malicious forces who may seek to abuse deniability. Data can be better exploited using modern algorithms to optimise command and control. Several countries, including the UK, US and Italy[21] [22], are seeking to embrace the benefits of autonomy. The Royal Navy is trialling an unmanned RIB[23], enabling routine tasks such as investigating suspicious vessels or transferring cargo, to be completed more safely and cost effectively. The value of autonomous boats will be all the greater during the pandemic, granting sailors a remote yet physical presence in blue and green water environments. The legal and ethical subtleties of sending an unmanned boat to approach a vessel of interest have evolved now that individuals could unknowingly be carrying a widespread virus. Where automated weapon stations and loudspeakers were viewed with caution, one could now argue that removing human operators from certain situations is a progressive step that will allow for safer and more logical decisions.

This paper began by examining how Covid-19, geopolitical tensions and climate change would influence and amplify one another in the maritime domain. It ends with the aspiration that these crises will themselves catalyse the development and uptake of contemporary technology and operational practises. Positive opportunities can be hard to see in troubled times. Navies that seize them now will enable themselves to fulfil their duties. Embracing the agility and pragmatism that has helped in 2020 may even provide immunity for the next crisis.

[21] Kyle Mizokami, “The U.S. Navy's New Robo-Boat Has No People, But It Does Have a Very Big Gun”, Popular Mechanics, 19 February 2020, https://www.popularmechanics.com/military/research/a31003656/cusv-robot-drone/
[22] “Italy supports new unmanned ship project”, Maritime Business World, 24 July 2020, https://www.maritimebusinessworld.com/italy-supports-new-unmanned-ship-project-1568h.htm
[23] “Royal Navy launches 'smart boat' for fleet of tomorrow”, Royal Navy, 24 June 2020, https://www.royalnavy.mod.uk/news-and-latest-activity/news/2020/june/24/200624-pac24-boat-trials

SPEECHES

WELCOME SPEECH

Capt (N) Sümer Kayser, Director of MARSEC COE

Distinguished participants, ladies and gentlemen,

Good morning from MARSEC COE, Istanbul, Turkey.

I am Capt.Sümer KAYSER, from Turkish Navy. I am the director of NATO Maritime Security Centre of Excellence (MARSEC COE).

Before starting my speech, I would like to thank you for your participation to the Maritime Security Conference-2020, which is specifically important to us in terms of being our first diamond event after the accreditation of MARSEC COE by NATO act as of 8th of June 2020, following the SC pre coordination meeting held recently.

I wish I could host you here concretely with a spectacular Istanbul strait view. However, I hope it will be next time.

First of all, I would like to mention that maritime domain provides an ideal medium for traditional security issues as well as new and evolving challenges such as terrorism, proliferation of weapons of mass destruction; cross-border organized crime and irregular migration continue to be major concerns against the sustainable peace and prosperity around the world. Now, we have an additional concern named “Covid-19”.

On the one hand, maritime domain is the most efficient and cost-effective method of international transportation of goods, providing a dependable, low-cost means, globally, facilitating commerce and helping to create prosperity among nations and people.

On the other hand, maritime transportation is dominantly focused on freight since there is no other effective alternative to the long distance transportation of large amounts of freight. The systematic growth of maritime freight traffic has been fueled by the increase in energy and mineral cargoes, globalization and technical improvements.

Over the last 150 years by providing cheap, reliable and efficient transportation, the shipping industry has helped turn the world into a single market place. It does not matter where the companies produce their raw materials and goods, they can be delivered to market for just a few dollars. As a result, today, the world is well along the road to an integrated global economy, and maritime transportation is playing a crucial and highly effective part in this process.

Therefore, maritime security (MARSEC) is becoming increasingly important for all states including even the landlocked countries, and the role of navies’ is to support safeguarding the maritime domain as globalization has both negative and positive effects over the seas.

World chokepoints for maritime transit of oil are critical part of global energy security. About 63% of the world oil production moves on maritime routes. The Strait of Hurmuz and the Strait of Malacca are the world’s most important strategic chokepoints by volume of oil transit.

Additionally, Istanbul and Çanakkale Straits, shortly Turkish Straits, do not only provide a vital link, but also constitute a major artery for the oil transit. The amount of Black Sea basin originated oil transportation through Turkish Straits has reached approximately 145 million tons per year. In other words, 3 million barrels of oil by 25-30 tankers are being transported to the global markets on a daily basis. 40% of this amount served to Europe.

As some of you know that the conference was first planned to be held in June 2020, however, it was postponed to this September due to Covid-19 outbreak, which has still been affecting the world globally on a large scale, including maritime domain. Therefore, the main theme of the conference was determined as "Maritime Security in Pandemic Environment" by aiming to provide a global and regional focus for maritime security and to discuss maritime security related issues including the challenges.

During the conference, we will try to bring forward maritime security challenges, potential impacts of the Covid-19 on maritime security and finally to put some solutions forward to cope with these challenges.

The maritime security conference will be the first of the series of NATO MARSEC COE conferences which we are planning to organize in close cooperation with academia, international organizations and other stakeholders of maritime security. Our ambition is to conduct these kinds of conferences annually and we are looking forward to meeting you here in Istanbul for the next conference. We are planning to release a conference proceeding book by November this year with the valuable articles of our speakers as the main product of the conference.

We believe that closer inter-agency cooperation with the universities and international organizations along with other stake holders of maritime security is essential for creating a safer and more secure maritime environment.

By the way, I would like to emphasize one point here that as MARSEC COE, we are very delighted to have 22 speakers from different stakeholders who are currently participating in our conference with a wide range of topics. I think this diversity will make a great contribution to the conference with the valuable expertise and knowledge of the distinguished speakers and moderators. And I hope the conference will be fruitful for all of us by bringing new perspectives to each of the topics and challenges.

Thereby, please feel free to ask as many questions as possible to make the conference interactive.

Before ending my speech, in advance, I would like to thank NATO MARSEC COE Conference Organization Committee, who did a great job with a delicate and precise preparation with all details of the activity. I wish good luck to all of you.

I would like to finish my speech with a quote from our great leader, Mustafa Kemal Atatürk, “Peace at home peace in the world”. And, once again, thank you very much for your very kind attention.

Please enjoy the conference.

CLOSING SPEECH

Capt (N) Sümer Kayser, Director of NATO MARSEC COE

Distinguished participants, ladies and gentlemen,

It has been two wonderful days and I assure you that the MARSEC-2020 conference has definitely demonstrated the ambition of close cooperation and collaboration of the maritime security stakeholders all around the world.

First of all, I would like to thank the Steering Committee of NATO MARSEC COE with the sponsoring nations, as of Turkey (framework nation), Greece and Romania for giving this opportunity to MARSEC COE to organize such a special event.

And, I would like to thank all moderators and speakers who have done a great job during the conference, and of course, to all attendees, for your kind participation in our first Maritime Security Conference under the NATO hat.

Moreover, as I mentioned yesterday, the Maritime Security Conference-2020 has been the first of the series of NATO MARSEC COE conferences, and our further aim is planning to organize new ones in close cooperation with academia, international organizations and other stakeholders of maritime security like this one, for better products and holistic approach. And we are looking forward to meeting you here in Istanbul for the next conference in person.

This annual conference has not only provided the intellectual power and context for future maritime security events, but also brought together key individuals, leaders and decision makers from international, regional, and national maritime security organizations, government/military officials, and representatives from industry, within an interagency approach.

Throughout the conference, we touched many maritime security related topics from different approaches such as:

- Maritime security challenges during the Covid-19 pandemic from a global perspective,

- Future role of naval forces and a general look at the role of maritime power,

- An overview of naval operations in confined and shallow waters,

- The impact of geopolitics on a national maritime strategy from the Bulgaria’s point of view,

- The northern sea route as an area of potential competition in the coming decades,

- An overview of grey zone/hybrid warfare activities in the maritime environment, specific operational impacts for navies,

- Space-based support for maritime situational awareness,

- The prevention of wmd proliferation in the maritime environment as well as cbrn defence, advanced analysis capacities, and – perhaps most importantly – the protection of crews.

- Specific maritime security challenges, underlining that different regions require different solutions such as the african region,

- The increasing resilience of maritime intelligence, surveillance and reconnaissance (isr) as well as on the potential impact of Covid-19 on related capabilities,

- Tackling maritime security challenges in a pandemic environment, namely through capacity building on the international level and through autonomous systems employed by navies,

To sum up, as I strongly emphasized yesterday, MARSEC COE has the vision and legitimate ambition of three priorities, which are, firstly, 'achieving to start the discussion of the **maritime security as a discipline**', and following 'to be the **maritime security discipline leader'** within NATO, last but not least 'promulgating a **NATO MSO Doctrine** with the contribution of respective maritime security stakeholders'.

Before ending my closing remarks, I would like to thank all MARSEC COE staff, especially the conference organization committee, who have shown a fantastic effort in order to organize this virtual conference. You did a great job. As the MARSEC COE Director, I am proud of each one of you.

That concludes my remarks, and thank you very much again for your participation, contributions and the fruitful discussions.

Hope to see you in Istanbul next time, all the best...

CLOSING REMARKS

Capt (N) Sümer Kayser, Director of NATO MARSEC COE

One of the most important outcomes of the Maritime Security Conference-2020 was that ***maritime security has to strike a balance between classic naval forces and other maritime assets***, often operated by private companies. While this balance was already delicate before the current pandemic, it may become even more complicated to find the perfect approach in the coming months and years when the wide-ranging impacts of COVID-19 become even more visible.

This year's event was therefore a timely discussion of the current view on future maritime security challenges and the best ways to address them. It followed up on previous conferences organised by MARSEC COE since the centre's inception in 2012. Moreover, ***this conference once again highlighted the increasingly close collaboration and cooperation among different maritime-focused centres of excellence within NATO***. Our collaboration will be even more important in the coming years to identify the maritime security concerns and priorities of different stakeholders, to facilitate the exchange of information and ideas and to provide a network where solutions and case studies are shared among a wide range of interested participants from militaries, governments, international organisations, NGOs and the private sector.

We definitely encourage all these stakeholders to share their own expertise, examples for best practices and other information that may be relevant to a wider audience. At MARSEC COE, we are conducting a broad range of activities to facilitate such learning experiences. The same is true for our partners in the network of centres of excellence, all with their own unique expertise on various subjects.

We are already looking forward to future workshops, seminars, conferences and similar activities, but please feel free to contact us directly in the meantime with your own ideas, suggestions and comments.

PICTORIAL

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NATO MARITIME SECURITY
CENTRE OF EXCELLENCE
MARSEC CONFERENCE
VIRTUAL MARITIME SECURITY CONFERENCE-2020
16-17 SEPTEMBER 2020


Welcome Speech
Capt. Sümer KAYSER (TUR N)
Director of MARSEC COE
CAPT.Sümer Kayser, MARSECCOE Director
Daniel-Cornel Tanasescu
Bernd Allert
Dirk Siebek
Brian Eggleston
Davide Re
Emre Bayrov


Introductory Comments
Dr. Dirk SIEBELS (DEU)
Academic Consultant
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Daniel-Cornel Tanasescu
Bernd Allert
Dirk Siebels
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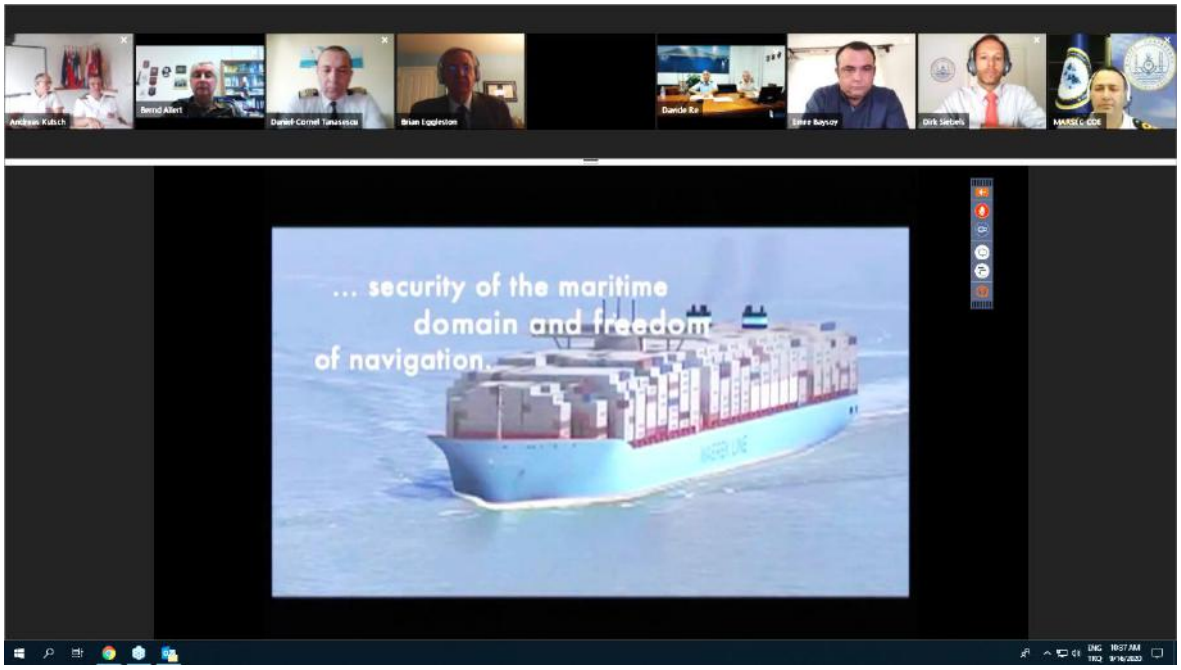
Davide Re
Emre Baysoy
CAPT.Sümer Kayser, MARSECCOE Director


... security of the maritime
domain and freedom
of navigation


Daniel-Cornel Tanasescu
Brian Eggleston
Davide Re
CAPT.Sümer Kayser, MARSECCOE Director


Daniel-Cornel Tanasescu
Brian Eggleston
Davide Re
CAPT.Sümer Kayser, MARSECCOE Director


Daniel-Cornel Tanasescu
Brian Eggleston
CAPT.Sümer Kayser, MARSECCOE Director
Mission*
Davide Re


Daniel-Cornel Tanasescu
Davide Re
CAPT.Sümer Kayser, MARSECCOE Director
LMIU COMAN
Emre Baysoy
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Sharing
Webcam
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Dashboard
Attendees: 85 of 501 (max)
Polls (3/17)
How did you find the topic 'Maritime...
Quite important
Important
I don't have an idea/ I am neutral
Unimportant
Quite important
Questions
Handouts: 4
Chat
MARSEC-2020 CONFERENCE DAY-1
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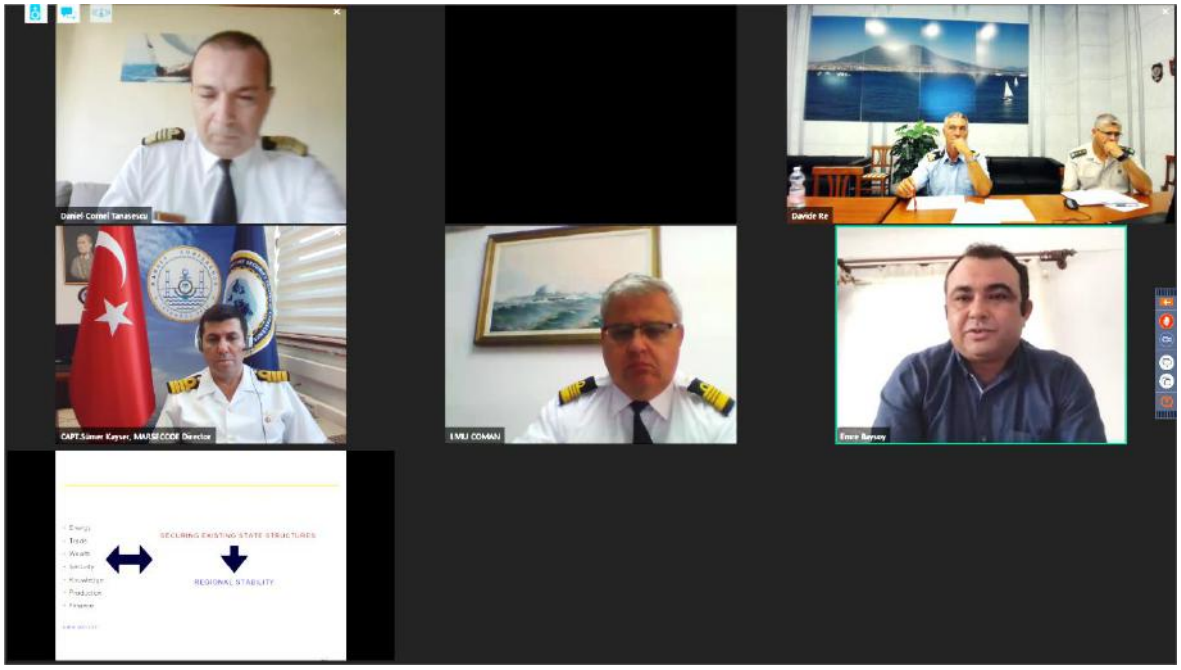
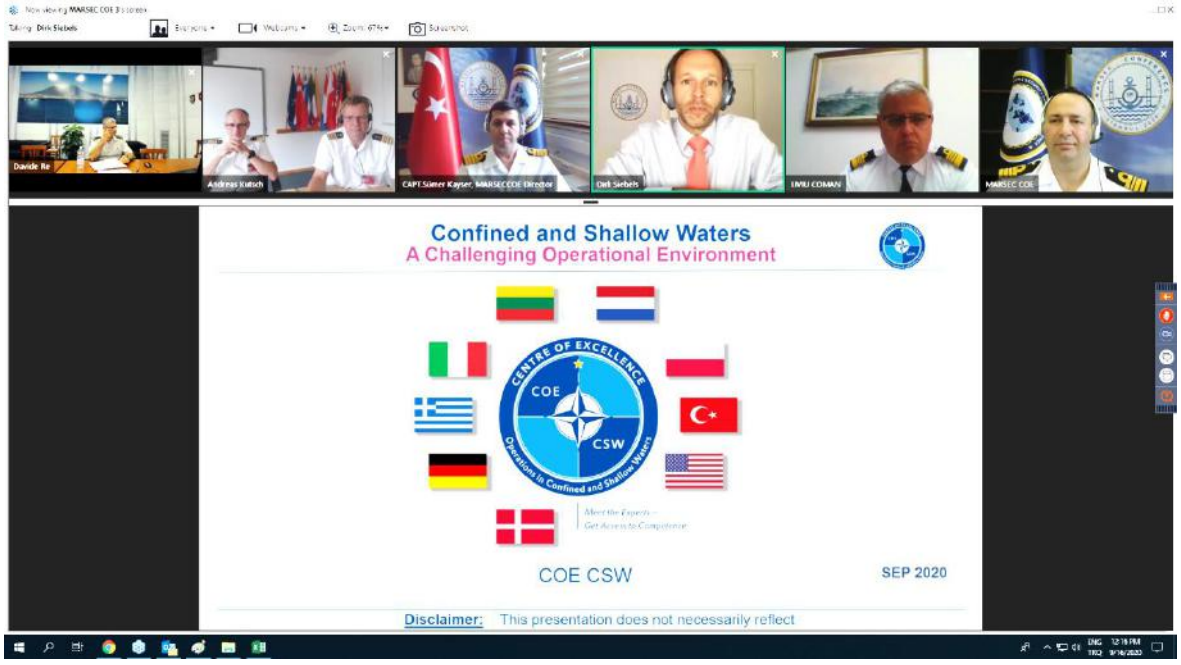
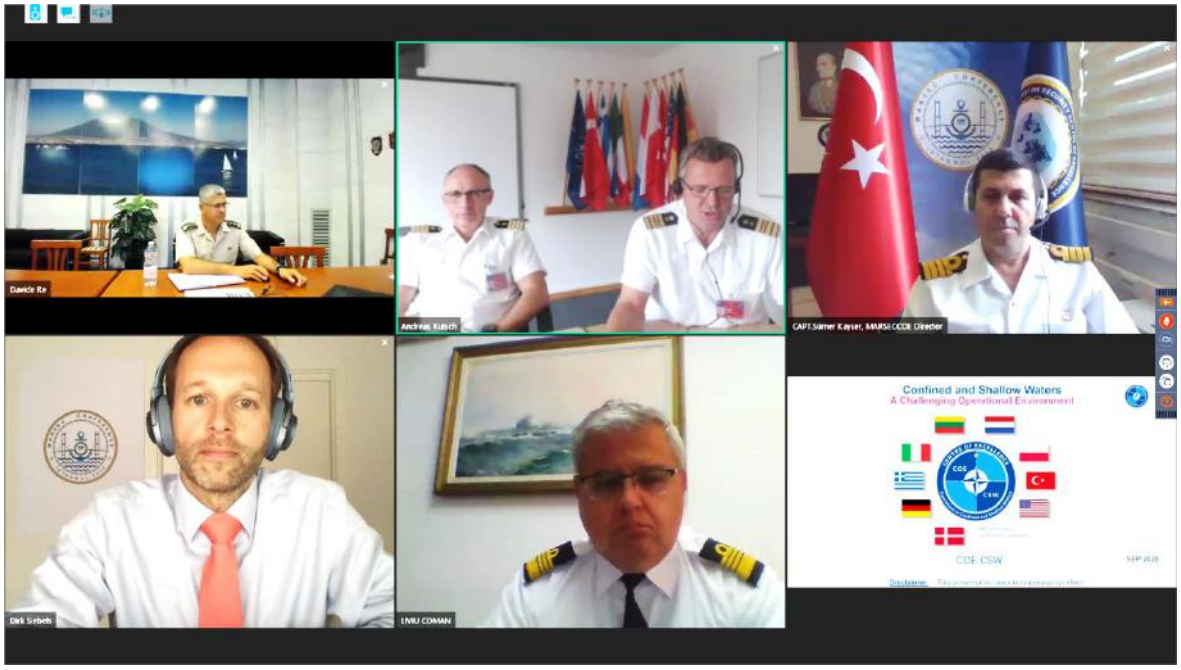

Daniel Cornel Tanasescu
Davide Re
CAPT.Sümer Kayser, MARSEC COE Director
LMLI COMAN
Emre Beyaz
SECURING EXISTING STATE STRUCTURES
REGIONAL STABILITY


Davide Re
Andreas Kutsch
CAPT.Sümer Kayser, MARSEC COE Director
Dirk Siebels
LMLI COMAN
MARSEC COE
Confined and Shallow Waters
A Challenging Operational Environment
CENTRE OF EXCELLENCE
COE
CSW
Operations in Confined and Shallow Waters
COE CSW
SEP 2020
Disclaimer: This presentation does not necessarily reflect


Davide Re
Andreas Kutsch
CAPT.Samet Kayser, MARSEC COE Director
Dirk Siebels
LtVU COMAN
Confined and Shallow Waters
A Challenging Operational Environment
CDE CSW


Daniel-Cornel Tanasescu
LtVU COMAN
CAPT.Samet Kayser, MARSEC COE Director
MARSEC COE
Black Sea Region
Challenges


MARITIME SECURITY CENTRE OF EXCELLENCE
The aim of this study
In this study, the future usability of the NSR in terms of maritime trade will be examined by making the comparison with the transition order in other transition patterns worldwide according to the UNCLOS and the Court of Justice Decisions and by making a literature review.

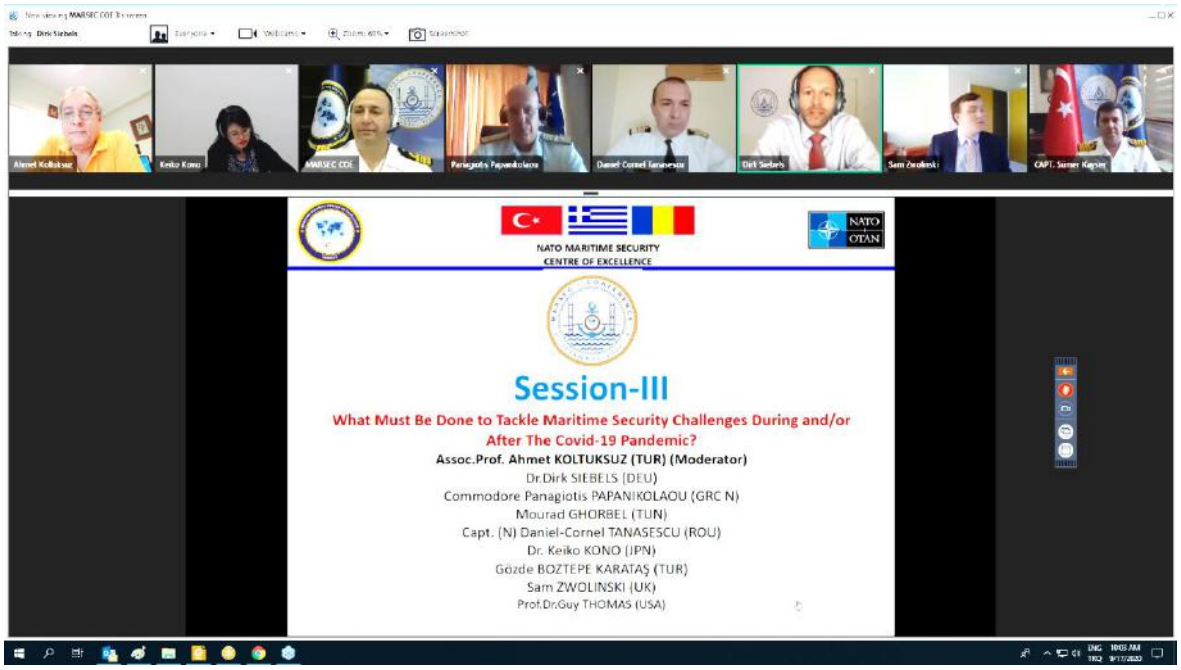

Session-I
Overview of Maritime Security Challenges
Wrap-up
Dr.Dirk SIEBELS (Moderator)

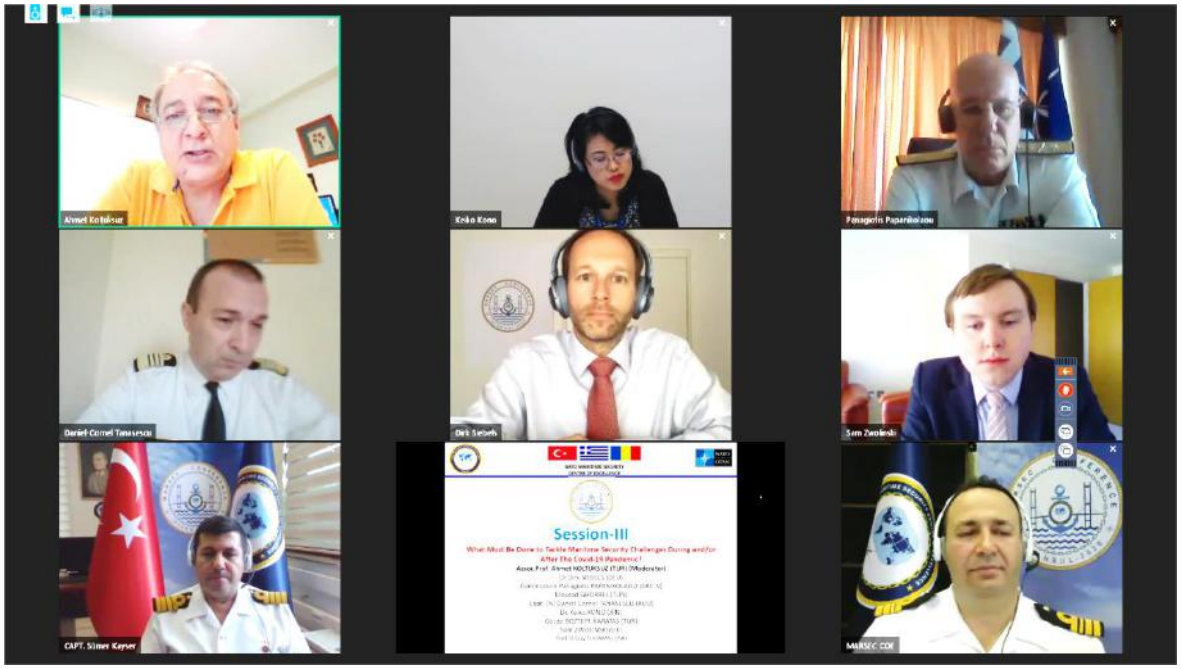

NATO MARITIME SECURITY
CENTRE OF EXCELLENCE
Session-II
Ongoing and/or Potential Impacts of The Covid-19 Pandemic on Maritime Security Challenges
Brian WILSON (USA) (Moderator)
Brian F. Eggleston (USA)
Prof. Guy THOMAS (USA)
Lt.Col. Bernd ALLERT (DEU)
Eylem KARAASLAN (TUR) - Aytaç KABAKLARLI (TUR)
Dr. Marten MEIJER (NLD)
Capt. (N) Liviu Auras COMAN (ROU)

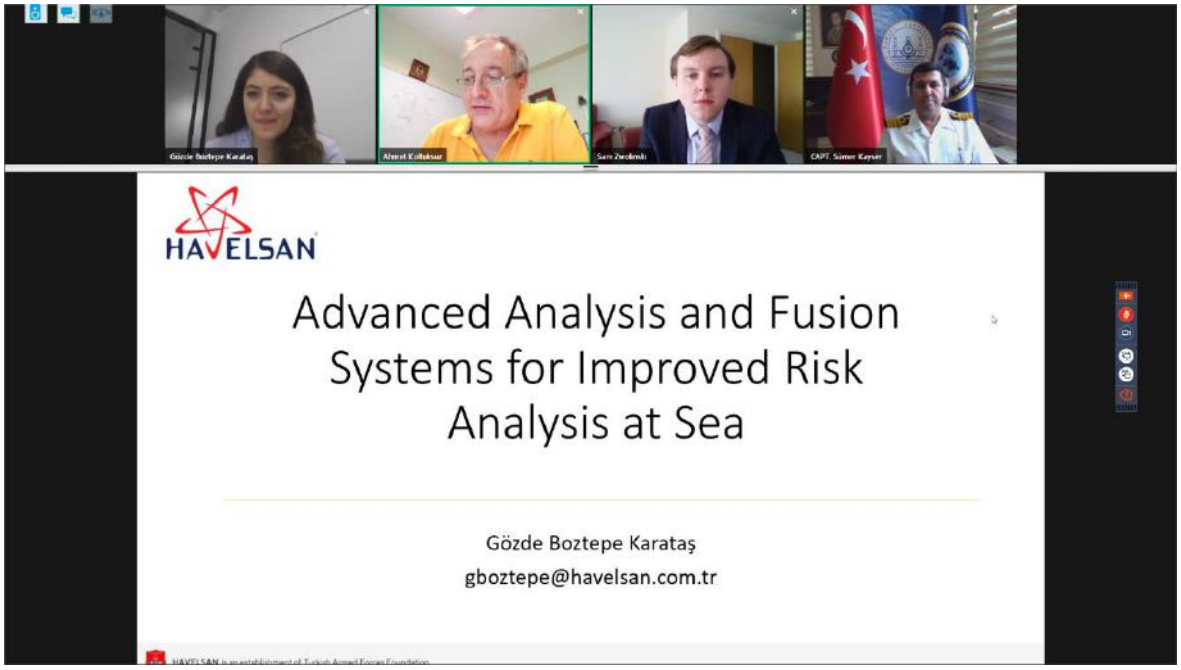

Operation ACTIVE ENDEAVOUR
Under Operation Active Endeavour, NATO ships patrolled the Mediterranean and monitored shipping to help deter, defend, disrupt and protect against terrorist activity.
NATO forces hailed over 128,000 merchant vessels and boarded some 172 suspect ships.
2016: Transition to Operation SEA GUARDIAN

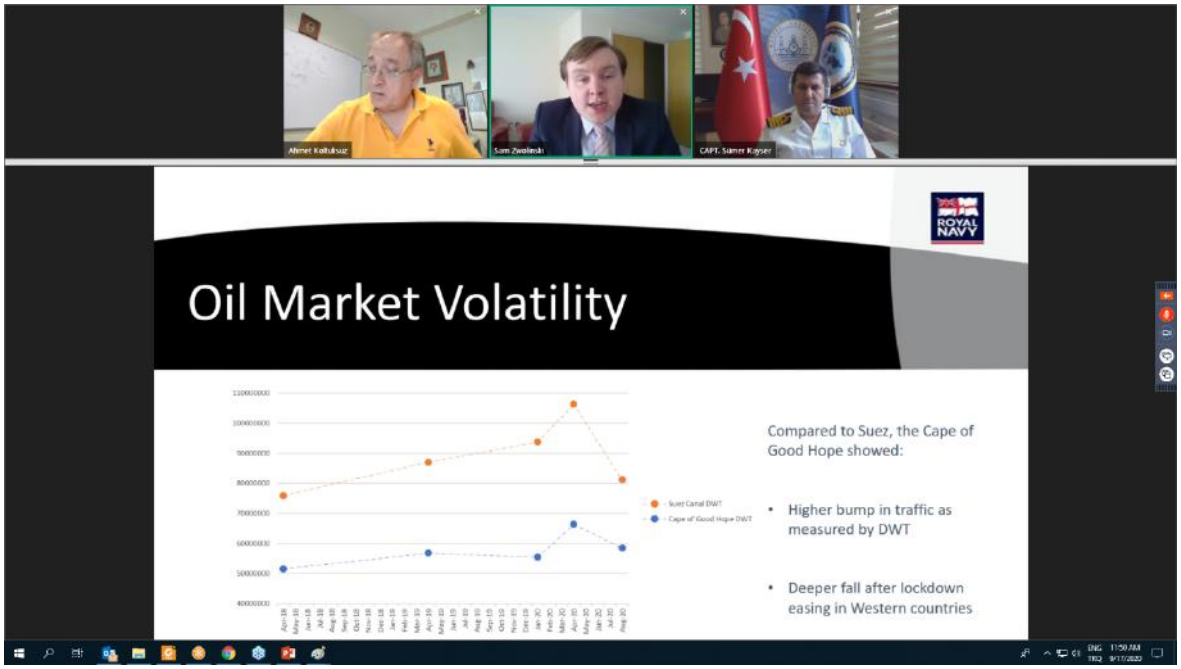

IMPLEMENTATION REPORT AND RECOMMENDATIONS ON NATO'SCOMPREHENSIVE STRATEGIC-LEVEL POLICY FOR PREVENTING THE PROLIFERATION OF WMD AND DEFENDING AGAINST CBRN THREATS
The capability to conduct Maritime Interdiction Operations (MIO) for the prevention of WMD proliferation is an important element of NATO's approach to preventing the proliferation of WMD and defending against CBRN threats.
C-M(2017)0028-AS1 dated 28 JUN 2019
RELEASABLE TO PUBLIC


HAVELSAN
COMMAND CONTROL & DEFENSE TECHNOLOGIES GROUP
CBRN Approach & Products & Solutions for
Maritime Security in a Pandemic Environment at Sea and Littoral Areas
September 16, 2020


NATO MARITIME SECURITY
CENTRE OF EXCELLENCE
NATO
OTAN
Session-III
What Must Be Done to Tackle Maritime Security Challenges During and/or
After The Covid-19 Pandemic?
Assoc.Prof. Ahmet KOLTUKSUZ (TUR) (Moderator)
Dr.Dirk SIEBELS (DEU)
Commodore Panagiotis PAPANIKOLAOU (GRC N)
Mourad GHORBEL (TUN)
Capt. (N) Daniel-Cornel TANASESCU (ROU)
Dr. Keiko KONO (JPN)
Gözde BOZTEPE KARATAŞ (TUR)
Sam ZWOLINSKI (UK)
Prof.Dr.Guy THOMAS (USA)

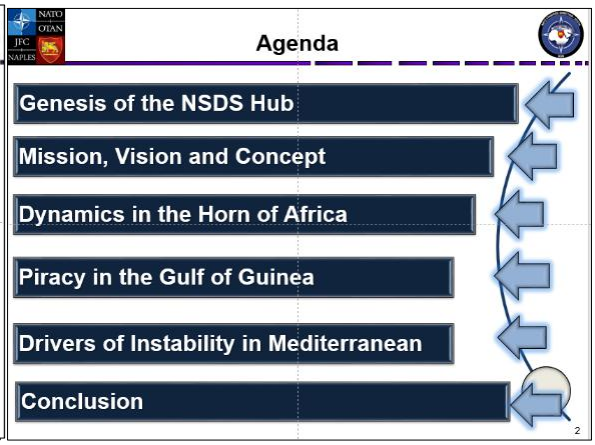

Session-III

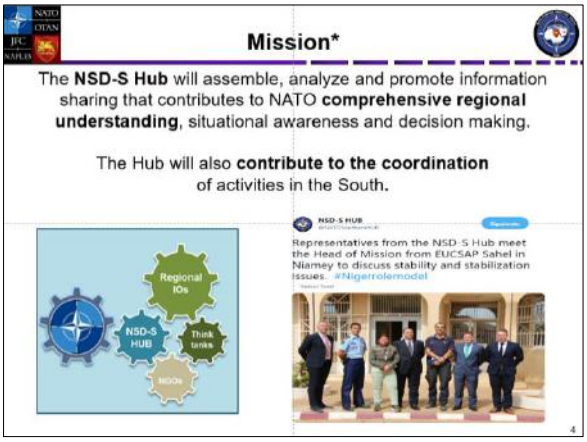

HAVELSAN
Advanced Analysis and Fusion Systems for Improved Risk Analysis at Sea
Gözde Boztepe Karataş
gboztepe@havelsan.com.tr


ROYAL NAVY
Oil Market Volatility
Compared to Suez, the Cape of Good Hope showed:
• Higher bump in traffic as measured by DWT
• Deeper fall after lockdown easing in Western countries

PRESENTATIONS

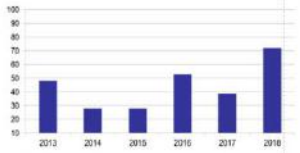
BRIG.GEN.DAVIDE RE





Piracy in the Gulf of Guinea (GoG)

- GoG is one of the World's richest yet still under-developed regions;
- Significant security issues pose a threat to domestic and regional stability (**82%** of world maritime **kidnapping** are in GoG);
- Piracy and maritime Armed Robbery (72 attacks in 2018 and **121** in **2019**);
- **UNSCR 2039** International Partners to provide support to enhance security.



Piracy/Armed Robbery attacks, actual and attempted attacks, International Maritime Bureau

Gulf of Guinea at a glance

It comprises 17 coastal states which cover 6,000 km from Senegal south to Angola, 2 island states, , 5 land-locked states (Mali, Burkina Faso, Niger, Chad, and Central African Republic) and has a total of 470 million inhabitants. The Gulf of Guinea States vary considerably in size, population, wealth and institutional and political stability.

Fig. 1

Piracy in GoG and LLDCs

- GoG region hosts 5 of the 32 Landlocked Developing Countries (LLDCs): Mali, Niger, Chad, Burkina Faso and Central African Republic;
- Goods to transit through at least one neighboring State to join the international trade routes, and this exposes them to security issues far beyond LLDCs' control;
- Adding to threats disseminated along the internal roads and railways, piracy in routes makes African mobility an increasingly difficult, risky and expensive business;
- Through insurance costs, piracy in GoG negatively impacts on LLDCs and amplifies international markets isolation (**818M$** losses, **214M$** in Contracted Maritime Security);

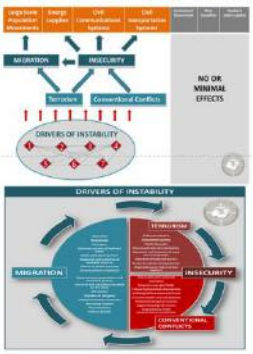
Dynamics in the Horn of Africa (HoA)

- HoA hosts a total of 282 million people and attracts many global powers striving to control its natural resources and trade routes (10% of world global trades);
- HoA's main threats are motivated by extreme religious beliefs, unemployment and marginalization as promoters of VEOs and foreign terrorist networks;

Maritime insecurity affects the routes crossing the Gulf of Aden and the Red Sea, casting a call upon international cooperation to ensure the secure navigation from Bab al Mandab Strait to the Suez Canal..

Forces in the Mediterranean Sea

- Migration and insecurity are the main forces influencing the stability of the Mediterranean Sea region;
- Migration and insecurity are tightly intertwined as they stem from and impact on closely interrelated drivers of instability (unemployment, food security, etc.);
- MENA rapid population growth will likely convert into a "demographic bomb" (Sahel case: double in 2040).



DELIVERABLES

CONCLUSIONS / KEY TAKE AWAYS

- Unique tool with Strategic effects to better understand regional dynamics and challenges **through the regional perspective** and to identify **opportunities for cooperation**;
- **NATO coordination tool** to enhance Partner's support (i.e., NATO to lead Maritime offer from multiple actors in Gulf of Guinea in direct link with **AU**, etc.);
- Expand HUB **regional network** and promote **NATO** as a **reliable Partner** able to contribute **from an African and Middle-Eastern point of view;**
- **Focal point** for **Allies** and **Partners** on different NATO Areas of cooperation through an enhanced knowledge on Allies bilateral activities;
- Increasing NATO expertise and products quality through an enhanced **Human Factor**.

PROF.DR.CRISTIAN BUEGER

Maritime Security and the Anthropocene
Tasks for the naval forces of tomorrow

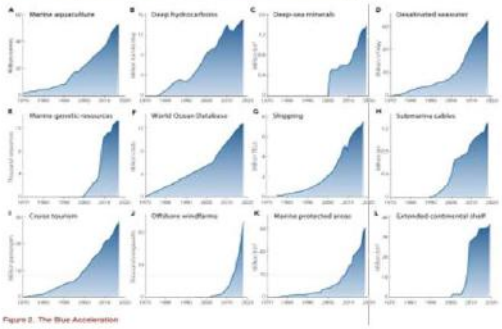
SAFESEAS

Prof. Christian Bueger
University of Copenhagen & SafeSeas

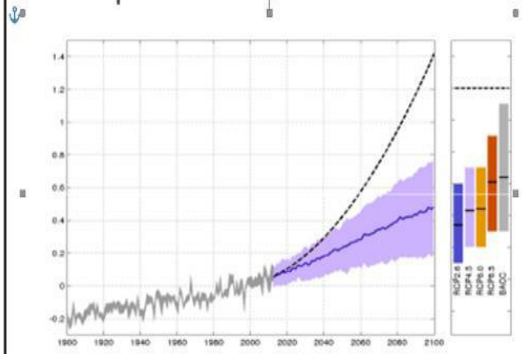
What will be the future challenges for
naval forces in a changing environment?

1) Trends in the anthropocene
2) Maritime Security
3) Operational Challenges
4) Preparedness

Anthropocene – increased activity



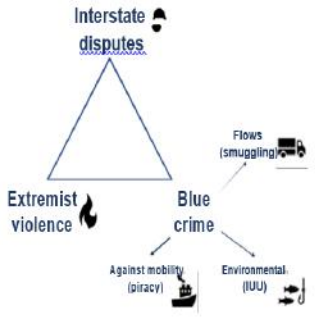
Anthropocene – sea level rise



Anthropocene – extreme weather

Anthropocene – conservation efforts

Maritime Security – A framework



Maritime Security – what will change

Trends	Likely impact
Economic pressures	New incentives to engage in blue crime
Food security	New patterns of illegal fishing
Disputed borders	New blue crime hot spots
Newly uninhabited areas	New blue crime hubs
Migration	More illicit migration, smuggling and trafficking
Political instability	Spillover, less law enforcement
New environmental	New criminalization

Maritime Security – what will change

	Impact	Potential Responses
Infrastructure	Flooding; extreme weather events; Submersion, deterioration of building structures and soil Higher maintenance costs	Protective structures; Hardening measures; Relocation
Seagoing	Increased wave heights; extreme weather events; shallow waters	Stronger capabilities (vessels); Skills trainings
Operational tasks	New patterns of blue crime; new and more environmental regulations; increased search and rescue; disaster relief and humanitarian assistance	New planning tools; New policing models; Surveillance and Maritime Domain Awareness Skills trainings

Conclusion

SAFESEAS

Assessments
Preparedness and Training
Synergize security & conservation
Visit: www.safeseas.net
Twitter:@c_bueger

DR.EMRE BAYSOY

Gateway Regions as a Threat to National and International Security

The Increasing Role of Maritime Power in Contemporary Geopolitics

ASST. PROF. DR. EMRE BAYSOY

1/7

Presentation Plan

1. Wavy Contemporary Geopolitical Conjuncture
2. Mediterranean as the Main Theatre Stage
3. In Between "Balance" and "Equilibrium: Gateway Regions or Sovereign States
4. The Importance of Maritime Power
5. Concluding Remarks

2/7

Wavy Contemporary Geopolitical Conjuncture

- Fading of the "Overlay"
- Turmoil of national, regional and international stability
- Emergence of disintegration trends: New-Tribalism
- Increase of human and drug trafficking, terrorism
- Radicalization and irredentism
- New Regionalism

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3/7

Mediterranean As the Main Theatre Stage

- Confrontation of Rimland and Heartland:
- Sea Power vs. Land Power

Figure: Dokos, T., (2008). "NATO's Mediterranean Dialogue: Prospects and Policy Recommendations."

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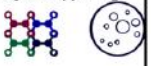
4/7

In Between "Balance" and "Equilibrium: Sovereign States or Gateway Regions?

- **Balance:** "A fixed arrangement, a formal disposition or array by ranks and clusters that requires strong regulation and implies a sharply defined set of niches separated by clear-cut boundaries".

- **Equilibrium:** "A condition of equal balance between arrays of opposing forces operating at different geographical states".



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5/7

The Importance of Maritime Power

- Energy
- Trade
- Wealth
- Security
- Knowledge
- Production
- Finance

SECURING EXISTING STATE STRUCTURES

REGIONAL STABILITY

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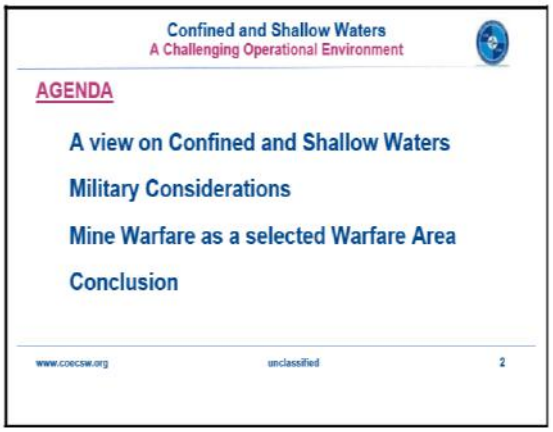
6/7

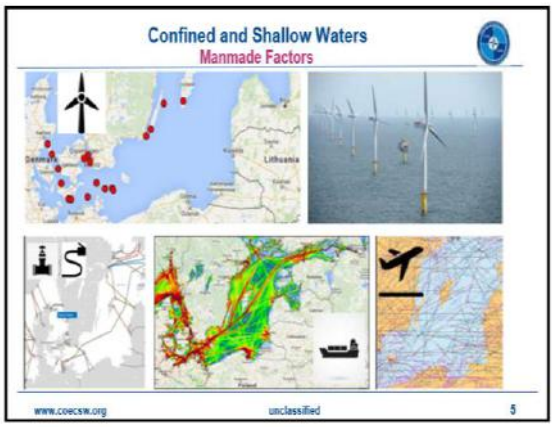
Concluding Remarks

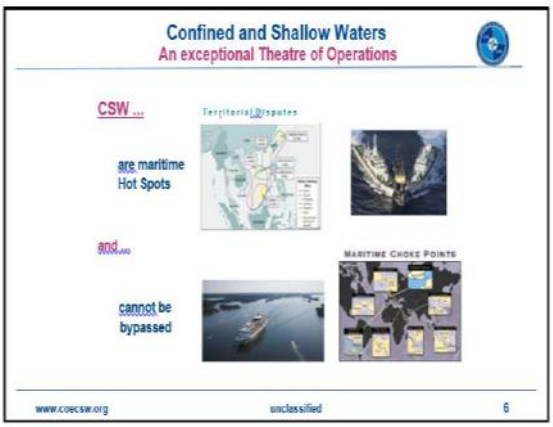
- The changing geopolitics generate tensions at regions like Mediterranean.
- Threats like terrorism and radicalization, in a way, legitimize some geopolitical projects such as building of gateway regions by using subnational groups, in the expense of national state structures.
- However, rather than being a solution to the threats, this attitudes increase threats ever than before.
- Maritime power becomes vital for preventing trends like new-tribalism which can be seen as the main cause of national and regional instability.
- In order to deal with the threats, maritime based national cooperations will be the antidote to the existing problems rather than the gateway regions.

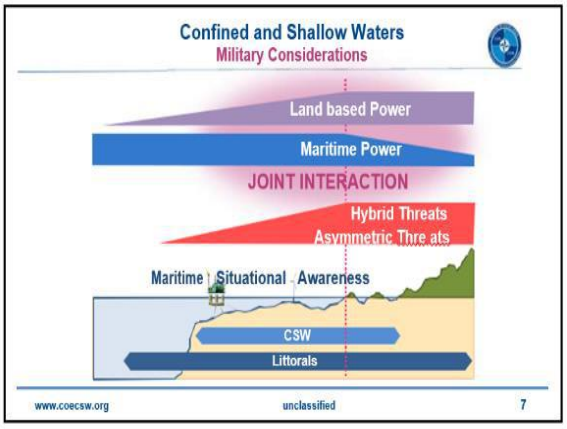
7/7

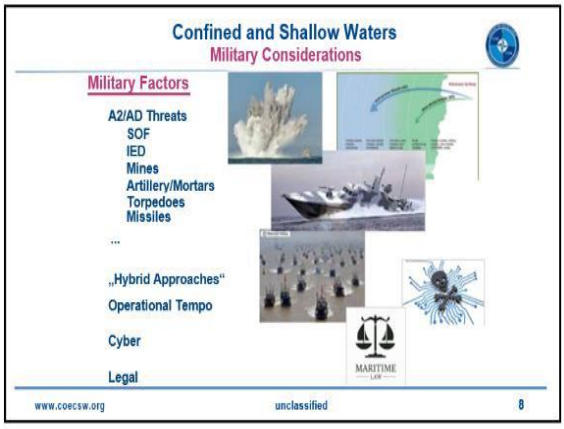
CDR. ANDREAS KUTSCH








Confined and Shallow Waters
Military Considerations
Land based Power
Maritime Power
JOINT INTERACTION
Hybrid Threats
Asymmetric Thre ats
Maritime Situational Awareness
CSW
Littorals
www.coecsw.org
unclassified
7


Confined and Shallow Waters
Military Considerations
Military Factors
A2/AD Threats
SOF
IED
Mines
Artillery/Mortars
Torpedoes
Missiles
...
„Hybrid Approaches"
Operational Tempo
Cyber
Legal
MARITIME
www.coecsw.org
unclassified
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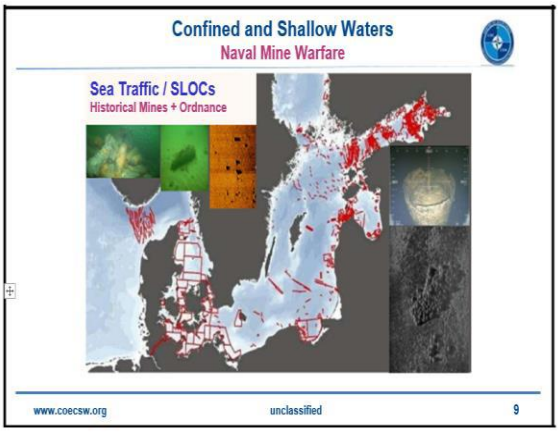
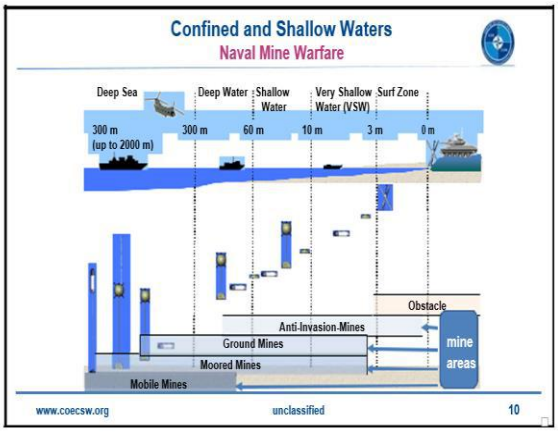
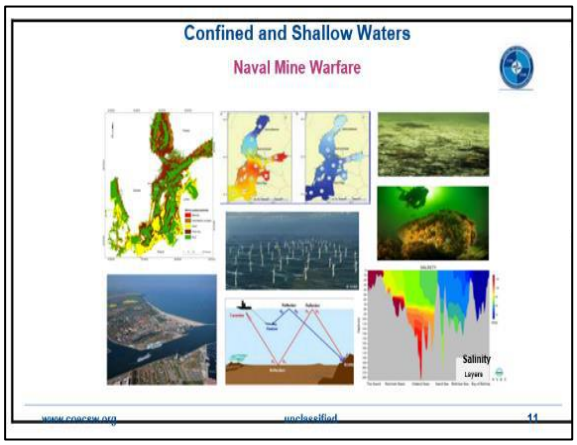
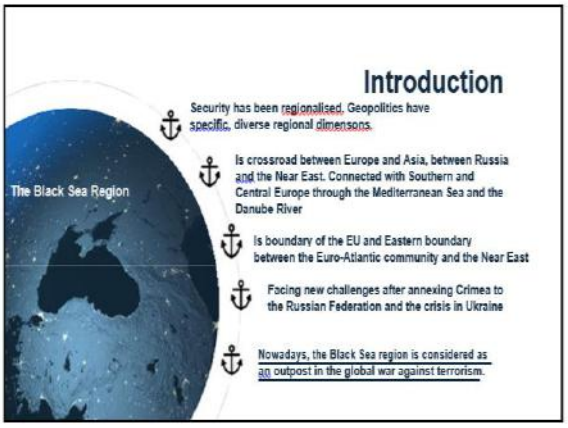

Confined and Shallow Waters
Naval Mine Warfare
Sea Traffic / SLOCs
Historical Mines + Ordnance
www.coecsw.org
unclassified
9

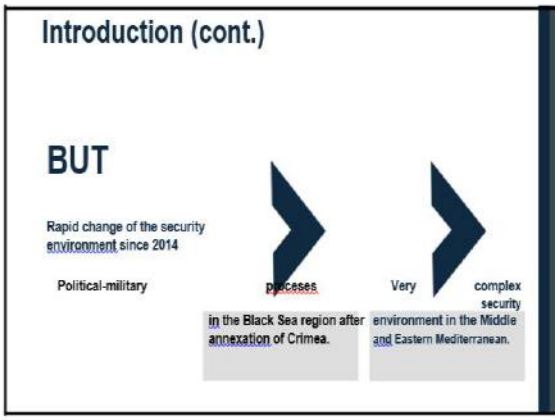

Confined and Shallow Waters
Naval Mine Warfare
Deep Sea
Deep Water
Shallow Water
Very Shallow Water (VSW)
Surf Zone
300 m (up to 2000 m)
300 m
60 m
10 m
3 m
0 m
Obstacle
Anti-Invasion-Mines
Ground Mines
Moored Mines
Mobile Mines
mine areas
www.coecsw.org
unclassified
10

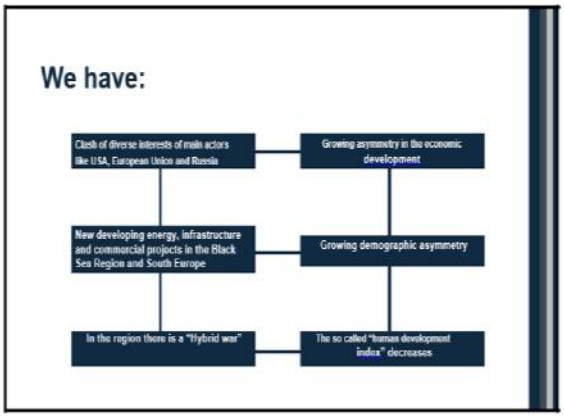

Confined and Shallow Waters
Naval Mine Warfare
Salinity
Layers
unclassified
11

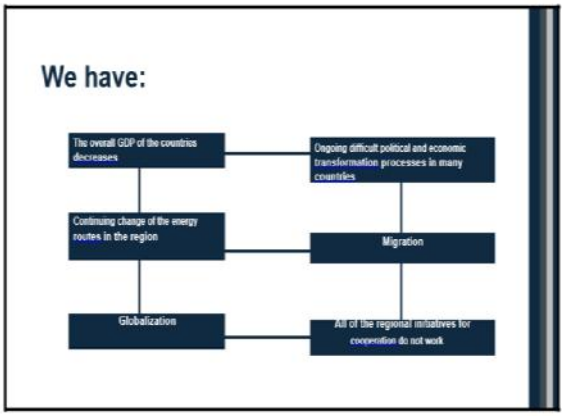

Confined and Shallow Waters
Conclusion
Confined and Shallow Waters:
Matter
Cannot be avoided
Are a demanding Operational Environment
Need specific capabilities
What we need:
Applicable Concepts & Doctrines
Appropriate Equipment
Maritime Situational Awareness & C4ISR
CSW Competence
Joint – Combined - Comprehensive
unclassified
12

Flotilla Admiral Prof. Dr. Dsc Boyan MEDNIKAROV









Geopolitical factors and their regional dimension:

In the context of the future of the INF-Treaty the regional political-military situation changed dramatically. The consequences from the Treaty withdrawal has negative effect on the security in the Black Sea region.

Traditional power policy in the modern environment has shifted from national to regional security.

Proceses of reallocation of political, economic, energy and military powers in the Black Sea Region and Eastern Europe have specific impact on the maritime domain.

However, this proceses are also linked to a demonstration of readiness for use of military force, which has brought back on the agenda the debate on territorial defense and the guarantee of effective measures to contain and deter Europe and the NATO allies .

Both NATO and EU concepts have changed from "collective defense" and building expeditionary forces for action in remote regions to "territorial defense and NATO border protection".

The continued presence of the NATO Response Force in the Baltic Sea, the „Tailored forward presence" in the Black Sea region, are respectively also part of the response to protect the Eastern flank.

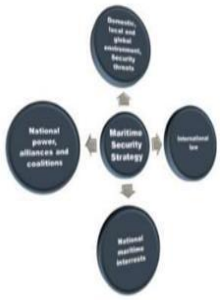
The completely new regional security environment related to the fight against terrorism, the race for natural and energy resources, and the rapid development of technology have only changed the perspective.

Moreover, the regional dimensions of opposition have also imposed new military doctrines based on local features of the security environment, particularly dominant in Eastern Europe.

The difficulties in implementing some maritime policies come from opposition through implicit, covert hybrid influences. More often heard are political calls for an urgent adaptation to new conditions of low-intensity, vague and covert enemy, involving paramilitary forces, lobbying and / or using economic influence to achieve military-political strategic goals.

These conditions include:

- Hybrid warfare, respectively combination of multiple conventional and unconventional tools of warfare , whereas more than 80% of the NATO critical infrastructure is owned and operated by the private sector.
- Cyber security f.ex. the cyber attack in 2017 on the Danish shipping company Maersk which cost unprecedented damages including complete lost of control of the management of its fleet spread in the world's seas and oceans. Several other sectors also suffered, as Maersk's global supply chain was virtually destroyed.
- Protection of energy supplies and maritime communication lines, again most of them under water and private.
- Traditional ones: trafficking, pollution of marine environment, pludering of resources etc.



Influence on the maritime security strategy

Conclusion

- The role of national maritime spaces for the Bulgarian geostrategic, economic, energy and environmental security is increasing.
- The need for providing the state's naval forces with modern and adequate naval capabilities is increasing as well.
- The challenge is to define those capabilities that are mostly cost effective, adaptive and useful in the context of one nation's missions, goals and vision for the future.

Conclusion (cont.)

- Achieving more multilateral, effective, secure and safe regional environment by cooperation and assistance.
- NVNA is actively engaged in this processes by assisting NATO in the field of naval education especially in Ukraine (NATO DEEP project).
- Peace and stability lead to economic growth and prosperity.

Brief summary

- Bulgaria's balanced foreign policy is the principle of contemporary national security policy including the maritime one.
- As NATO and EU border Bulgaria is determined to safeguard its borders and national maritime spaces facing new non-military challenges with adequate capabilities in multilateral and regional format.

References

1.Люцанова, С. Военноморската доктрина на Руската Федерация до 2030 г. В: Научни трудове на ВВМУ, Варна, 2017, ISSN 1312-8957

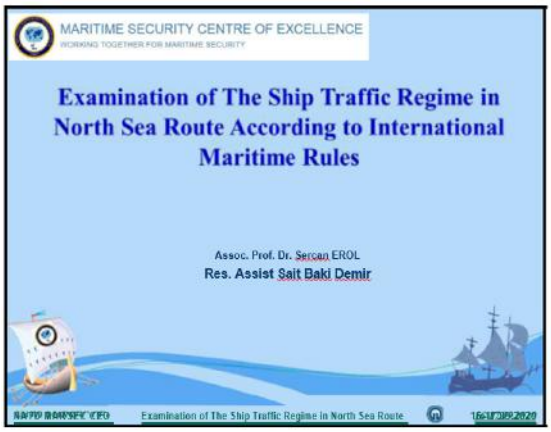
2.Люцанова, С. Място и роля на българските Военноморски сили в съвременната реалност - В: научно сп. „Механика, Транспорт, Комуникации", том 17, бр.2, 2019, с. 1-7. ISSN 2367-6620

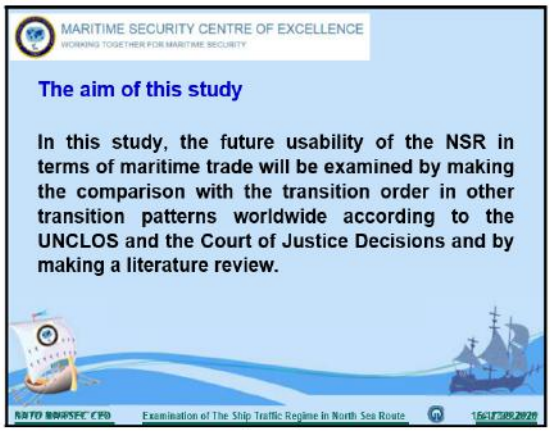
3.Szybicki, T. Presentation on "Maritime Security Strategy of the State", Polish Naval academy, September 2019.

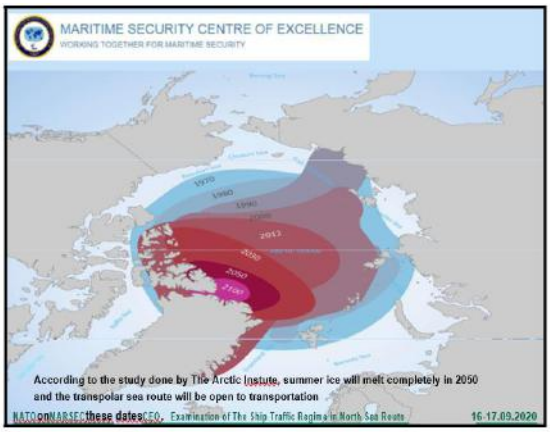
4.Lodemark: The Navy's Strategy for 2020, National Defense, Ottawa, 2001, pp.34-35.

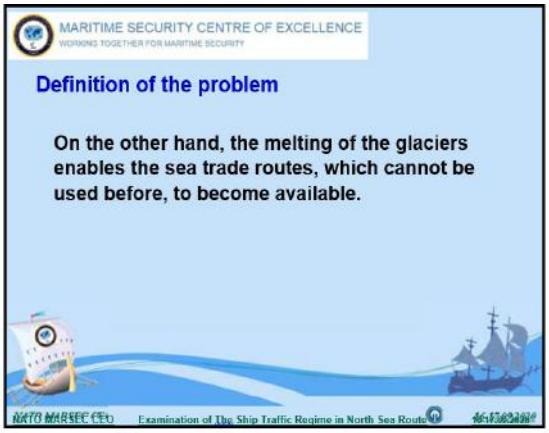
5.https://www.nato.int/cps/cz/natohq/opinions_170337.htm?selectedLocale=en

ASSOC.PROF.SERCAN EROL

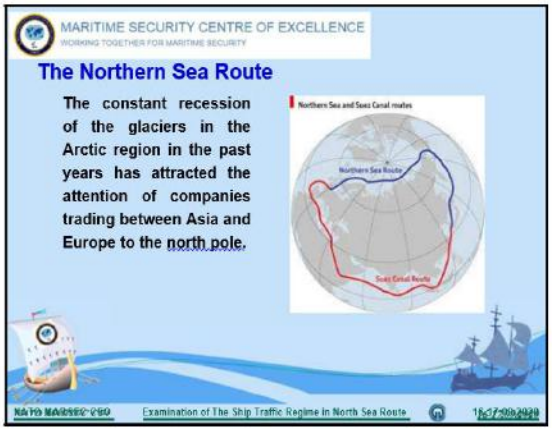


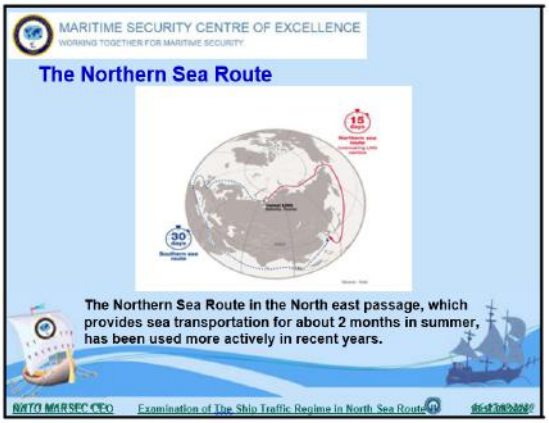


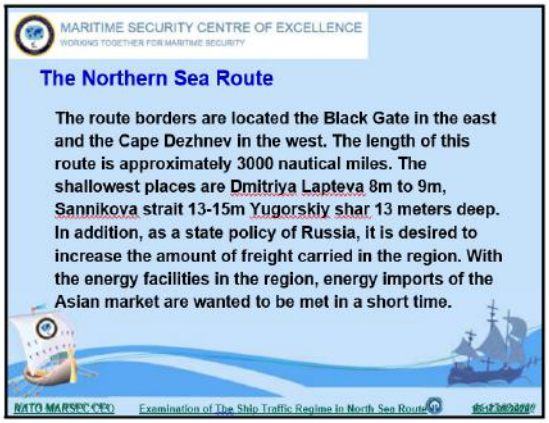


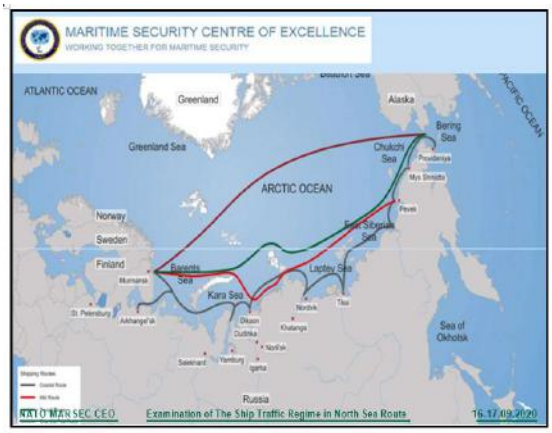



MARITIME SECURITY CENTRE OF EXCELLENCE
WORKING TOGETHER FOR MARITIME SECURITY
Polar Shipping Routes
Average September ice extent
Average February ice extent
Russia
United States
Greenland
Canada
Arctic Bridge
Northern Sea Route
Northwest Passage
Transpolar Sea Route
NATO MARSEC CEO
Examination of The Ship Traffic Regime in North Sea Route
16.17.09.2020

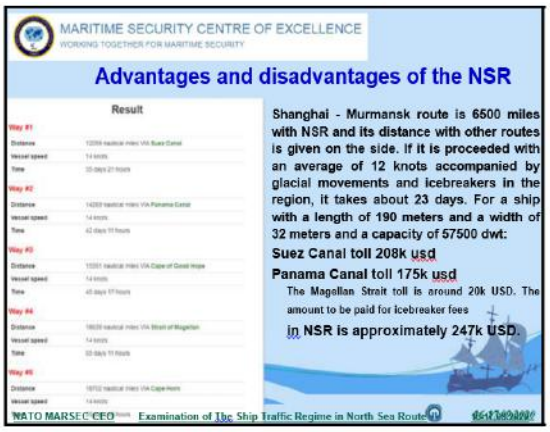

MARITIME SECURITY CENTRE OF EXCELLENCE
WORKING TOGETHER FOR MARITIME SECURITY
The Northern Sea Route
The constant recession of the glaciers in the Arctic region in the past years has attracted the attention of companies trading between Asia and Europe to the north pole.
Northern Sea and Suez Canal routes
Northern Sea Route
Suez Canal Route
NATO MARSEC CEO
Examination of The Ship Traffic Regime in North Sea Route


MARITIME SECURITY CENTRE OF EXCELLENCE
WORKING TOGETHER FOR MARITIME SECURITY
The Northern Sea Route
15 Days
30 Days
The Northern Sea Route in the North east passage, which provides sea transportation for about 2 months in summer, has been used more actively in recent years.
NATO MARSEC CEO
Examination of The Ship Traffic Regime in North Sea Route

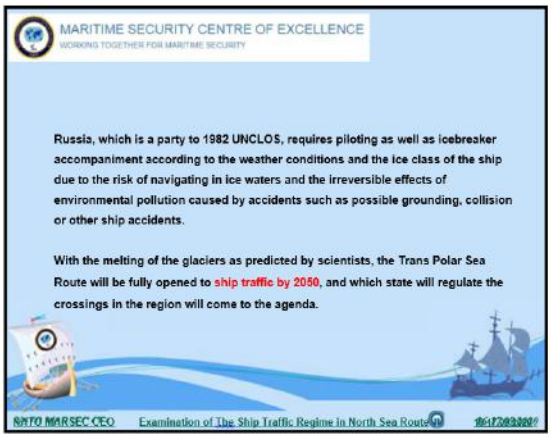

MARITIME SECURITY CENTRE OF EXCELLENCE
WORKING TOGETHER FOR MARITIME SECURITY
The Northern Sea Route
The route borders are located the Black Gate in the east and the Cape Dezhnev in the west. The length of this route is approximately 3000 nautical miles. The shallowest places are Dmitriya Lapteva 8m to 9m, Sannikova strait 13-15m Yugorskiy shar 13 meters deep. In addition, as a state policy of Russia, it is desired to increase the amount of freight carried in the region. With the energy facilities in the region, energy imports of the Asian market are wanted to be met in a short time.
NATO MARSEC CEO
Examination of The Ship Traffic Regime in North Sea Route


MARITIME SECURITY CENTRE OF EXCELLENCE
WORKING TOGETHER FOR MARITIME SECURITY
ATLANTIC OCEAN
Greenland
Greenland Sea
Alaska
Bering Sea
Chukchi Sea
ARCTIC OCEAN
Norway
Sweden
Finland
Barents Sea
Kara Sea
Laptev Sea
East Siberian Sea
Sea of Okhotsk
Russia
NATO MARSEC CEO
Examination of The Ship Traffic Regime in North Sea Route
16.17.09.2020


MARITIME SECURITY CENTRE OF EXCELLENCE
WORKING TOGETHER FOR MARITIME SECURITY
Advantages and disadvantages of the NSR
Being shorter than traditional shipping routes
Save time and voyage costs
Less security risk compared to Suez route
Less emissions
Only open during certain seasons
Irregular glacial movements
The presence of sea ice, freezing cold,
lack of maps and infrastructure
Building costs of icebreakers
Lack of ship crew have ice navigation experience
Distance to supply points
Irreversible effects of possible marine pollution
Environmental impacts that will be more effective in the polar region(emissions)
NATO MARSEC CEO
Examination of The Ship Traffic Regime in North Sea Route

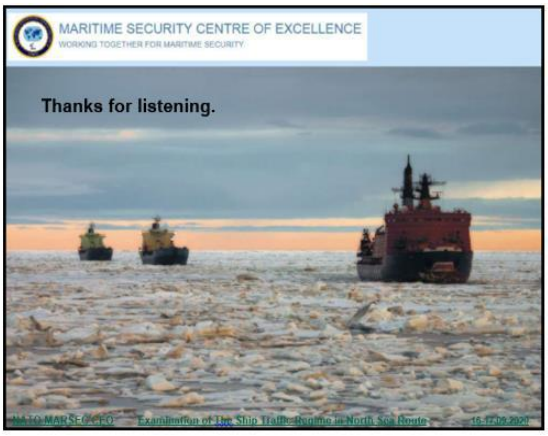

MARITIME SECURITY CENTRE OF EXCELLENCE
WORKING TOGETHER FOR MARITIME SECURITY
Advantages and disadvantages of the NSR
Result
Shanghai - Murmansk route is 6500 miles with NSR and its distance with other routes is given on the side. If it is proceeded with an average of 12 knots accompanied by glacial movements and icebreakers in the region, it takes about 23 days. For a ship with a length of 190 meters and a width of 32 meters and a capacity of 57500 dwt:
Suez Canal toll 208k usd
Panama Canal toll 175k usd
The Magellan Strait toll is around 20k USD. The amount to be paid for icebreaker fees in NSR is approximately 247k USD.
NATO MARSEC CEO
Examination of The Ship Traffic Regime in North Sea Route


MARITIME SECURITY CENTRE OF EXCELLENCE
WORKING TOGETHER FOR MARITIME SECURITY
Passage Regime of the NSR
Most of the NSR route passes through Russian territorial waters.
The right of innocent passage is the main restriction imposed by international law over any coastal State wishing to exercise sovereignty over its territorial sea.
NATO MARSEC CEO
Examination of The Ship Traffic Regime in North Sea Route

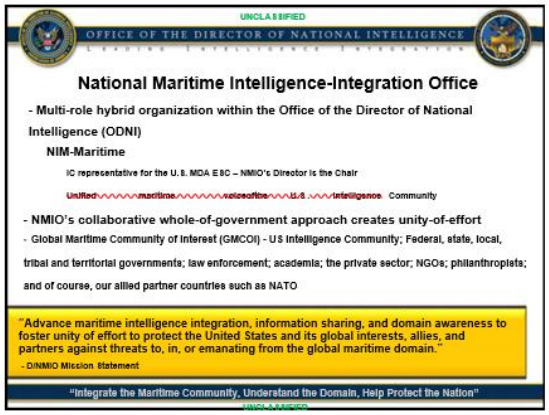

MARITIME SECURITY CENTRE OF EXCELLENCE
WORKING TOGETHER FOR MARITIME SECURITY
Russia, which is a party to 1982 UNCLOS, requires piloting as well as icebreaker accompaniment according to the weather conditions and the ice class of the ship due to the risk of navigating in ice waters and the irreversible effects of environmental pollution caused by accidents such as possible grounding, collision or other ship accidents.
With the melting of the glaciers as predicted by scientists, the Trans Polar Sea Route will be fully opened to ship traffic by 2050, and which state will regulate the crossings in the region will come to the agenda.
NATO MARSEC CEO
Examination of The Ship Traffic Regime in North Sea Route

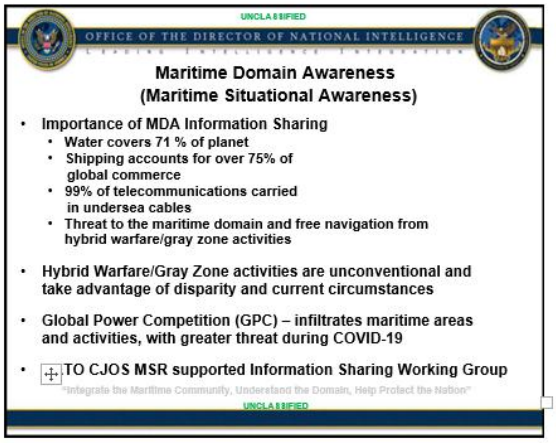

MARITIME SECURITY CENTRE OF EXCELLENCE
WORKING TOGETHER FOR MARITIME SECURITY
Passage Regime of the NSR
NSR route passes are controlled by Northern Sea Route Administration and the required documents are same as Singapore Strait, Turkish Straits or any documents required for ships passage.
NSR passage rules are 9 chapters and all information can be reached its website http://www.nsra.ru/en/contact.html
1) General
2) Procedure of the navigation of ships in the water area of the Northern Sea Route
3) Rules of the icebreaker assistance of ships in the water area of the Northern Sea Route
4) Rules of the pilot ice assistance of ships in the water area of the Northern Sea Route
NATO MARSEC CEO
Examination of The Ship Traffic Regime in North Sea Route


MARITIME SECURITY CENTRE OF EXCELLENCE
WORKING TOGETHER FOR MARITIME SECURITY
Passage Regime of the NSR
5) Rules of the assistance of ships on seaways of the water area of the Northern Sea Route
6) Provision about the navigational-hydrographic and hydrometeorologic support of the navigation of ships in the water area of the Northern Sea Route
7) Rules of the radio communication during the navigation of ships in the water area of the Northern Sea Route
8) Requirements to ships pertaining to the safety of navigation and protection of the marine environment from the pollution from ships
9) Other provisions in relation to the organization of the navigation of ship in the water area of the Northern Sea Route
NATO MARSEC CEO
Examination of The Ship Traffic Regime in North Sea Route

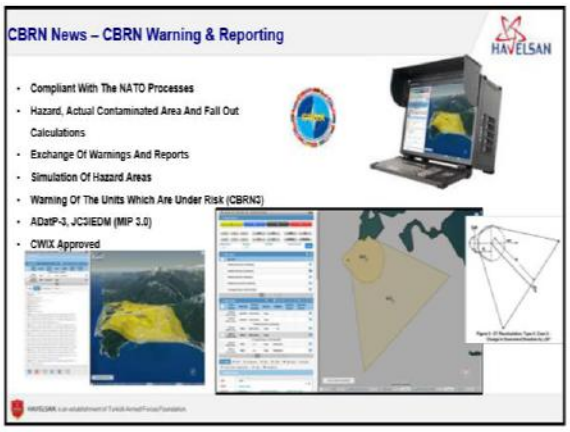

MARITIME SECURITY CENTRE OF EXCELLENCE
WORKING TOGETHER FOR MARITIME SECURITY
Thanks for listening.

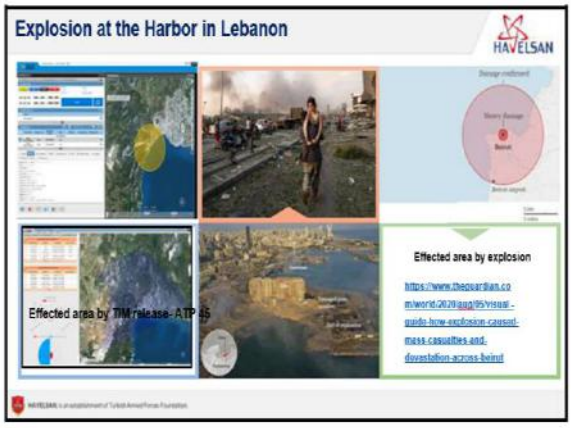
BRIAN F.EGGLESTON

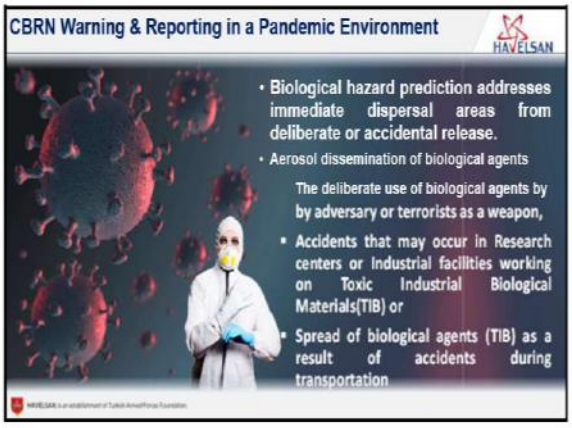


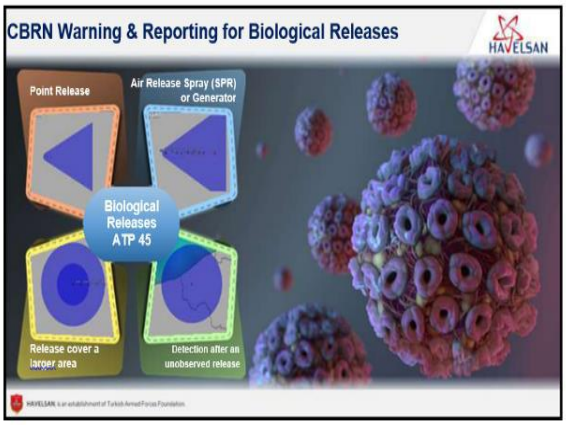


EYLEM KARAASLAN

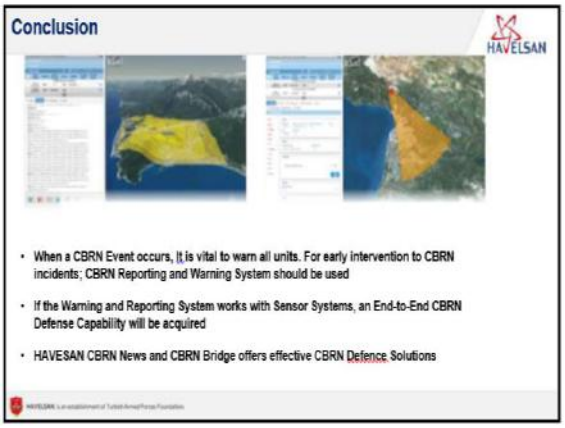






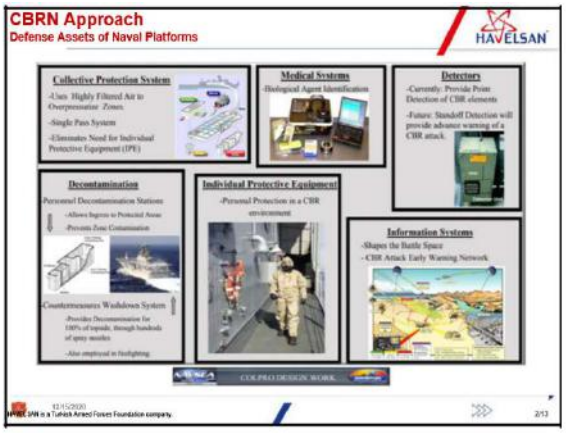

CBRN Warning & Reporting for Biological Releases
HAVELSAN
Point Release
Air Release Spray (SPR) or Generator
Biological Releases ATP 45
Release cover a larger area
Detection after an unobserved release

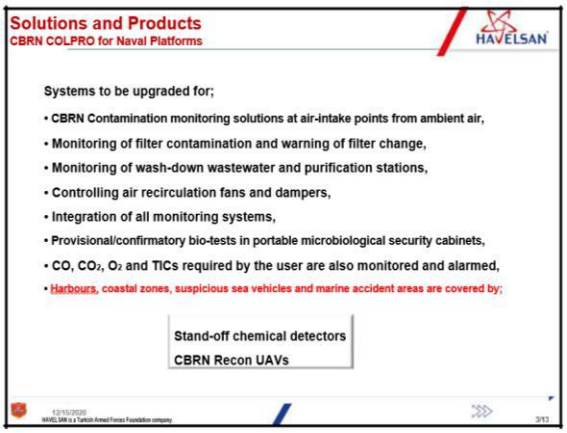

CBRN End To End Solution CBRN Bridge
HAVELSAN
ADDING CBRN MINDSET TO THE PLATFORMS
Integration Infrastructure / Framework
Sensor Remote Control, Logging, Archiving, Analysis
Integration With Wide Range Of CBRN Sensors
Meteorology Sensor Integration
GPS, Video Support
Map
CBRN 4 Message
Radio Support
Hardware Or Software Option
Sensor Integration Management Hardware
Sensor Integration to the Monitoring & Management

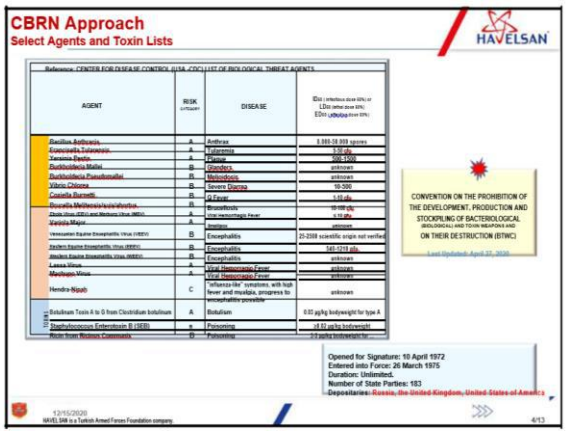

Conclusion
HAVELSAN
When a CBRN Event occurs, it is vital to warn all units. For early intervention to CBRN incidents; CBRN Reporting and Warning System should be used
If the Warning and Reporting System works with Sensor Systems, an End-to-End CBRN Defense Capability will be acquired
HAVESAN CBRN News and CBRN Bridge offers effective CBRN Defence Solutions

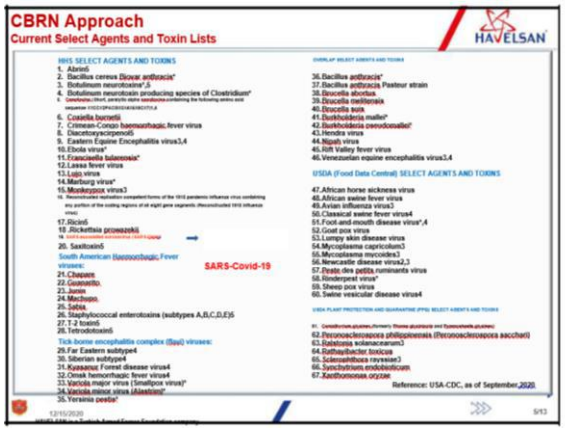

HAVELSAN
HAVELSAN Life Saving CBRN Solutions...
THANK YOU...
Eylem KARAASLAN
CBRN Product Manager
ekaraaslan@havelsan.com.tr

AYTAÇ KABAKLARLI









Solutions & Products
Bio Detection Warning Identification Reporting System

LAMP4U-PoC

handheld biological diagnostic platform for performing PCR reactions in the field.
IoT compatible.

LAMP4U-BAGLAB

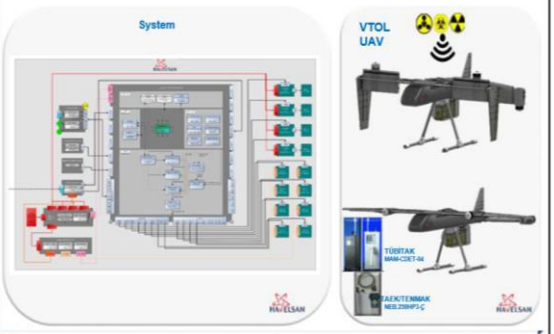
a portable bag format that can run PCR processes in the field using isothermal amplification technology,
IoT compatible,
can be used with the LAMP4U-Covid19 diagnostic kit for the diagnosis of SARS-Covid-19.
thenafter a simple process of swap, sampling will be to exposable cartridge, identification results in 60 mins with high precision.

Solutions & Products
Bio Detection System

BIOSENS HYBRID

a bag-sized portable diagnostic device that can carry out both ELISA and PCR reactions simultaneously.
IoT compatible,
can be used with the LAMP4U-Covid19 diagnostic kit for the diagnosis of SARS-Covid-19.

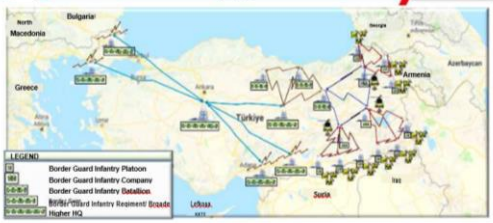
Solutions & Products
CBRN Recce UAVs



Solutions & Products
CBRN Recce UAVs

- System consists of application specific sensor set (visible and IR cameras, CBRNe), Mobile Edge Computing (MEC) processor and communication units.
- Connects to an IP network of sensors.
- Performs mission autonomously within the predetermined boundaries, flight pattern and format.
- Serves as a complementary unit to the land CBRN recon platforms in order to exclude exposure threat.
- Enhances PSOs & PKOs monitoring and management activities as well as disasters.
- Assumes CBRN recon roles on harsh environment restricting land unit operations.
- Minimizes the risks by stand-off detection and increases the accuracy by point detecting and sampling the threat at hot zones.
- Increases the fidelity of mapping contamination zones by predicting local real-time weather parameters.
- Time-saving, source-saving with its speed and agility.

Solutions & Products
CBRNe Integrated Solution for Border Security Application



- A Border security complement sub-system designed to meet all CBRN detecting, identifying, early warning and sampling requirements.
- Tiered system architecture relies on hierarchical order from border platoon to higher HQs responsibilities.
- The vulnerable areas and the gaps among the border platoons (CBRN detector sets) are covered by the CBRNe UAVs as well as the chemical stand-off detectors.
- System is identically and properly applicable for naval bases and littoral area monitoring.

Solutions & Products
CBRN Monitoring & Reporting System

CBRN Approach
Defense Assets of Naval Platforms

Due to their special application conditions, surface vessels require a high degree of precision and reliability when it comes to installed systems and components.

As the outfitters of the latest state-of-the-art MİLGEM type corvettes as well as MİLGEM class frigates of the Turkish Navy, operating together with the Turkish Defence Industry companies and governmental institutions, HAVELSAN is the right partner for you when it comes to tailor system solutions and complete turnkey systems in the area of CBRN monitoring, protection.

Safe operation is warranted - at any time and in all climatic conditions.

HAVELSAN

THANKS

(R) Col. Aytaç KABAKLARLI
Solution Eng.& CBRN Specialist
Mobile: +90 505 8870586
akabaklarli@havelsan.com.tr
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Mustafa Kemal Mahallesi 2120 Cad. No:39
06510 Çankaya
ANKARA - TURKEY

CAPT. (N) LIVIU AURAS COMAN

IMPROVING READINESS AND PROTECTING CREWS TO MAINTAIN A RELIABLE MARITIME SECURITY LEVEL IN PANDEMIC ENVIRONMENT

Capt. (N) Auras Liviu COMAN

Agenda

- Change of maritime security paradigm under COVID-19 pandemic
- Globalization vs regionalism – cooperation vs isolationism
- Readiness and crew protection
- Takeaways

COVID – 19 INTERACTIONS

COVID 19 vs COOPERATION

- A need for multilateral consensus
- Border permeability
- Dilution of globalization to the detriment of regionalization
- Military cooperation – a decreased level

READINESS & TRAINING

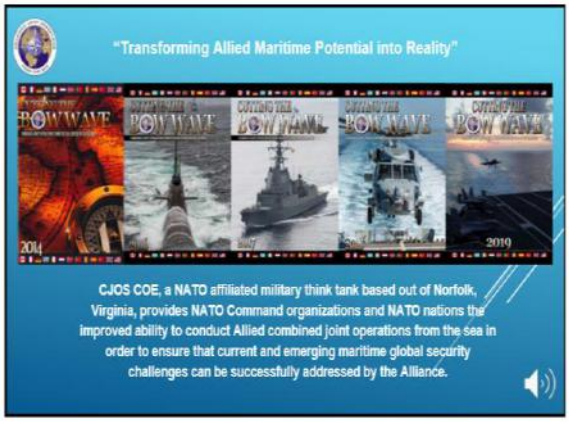
- Requires new challenges
- Reconfiguration of all SOPs
- Physical training limitations
- Change of medical legislation – terms & definitions
- Training o/b ships reevaluated

TAKEAWAYS

- Solidarity of all countries to act together
- Transition from globalization to regionalization
- Borders became closed for indefinite period of time
- New inflections of the security regionalization physiognomy
- The old maritime security strategies have to be reanalyzed
- Increased importance of unmanned vehicles

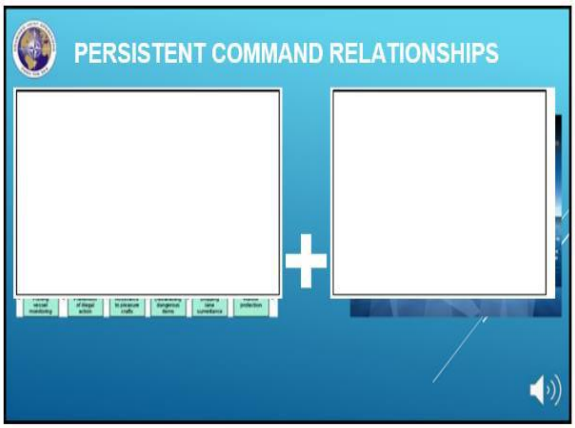
Readiness of the Navy has a new face

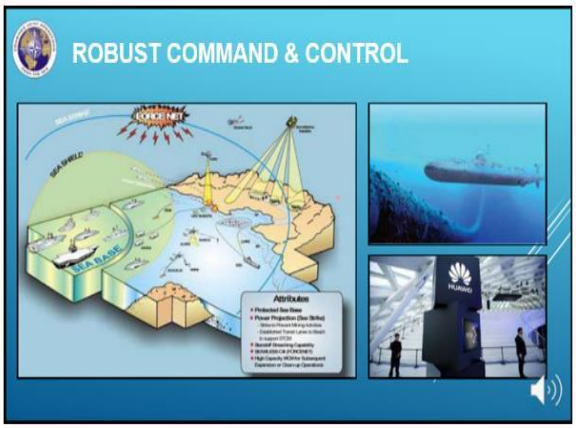
CAPT. (N) TODD BONNAR



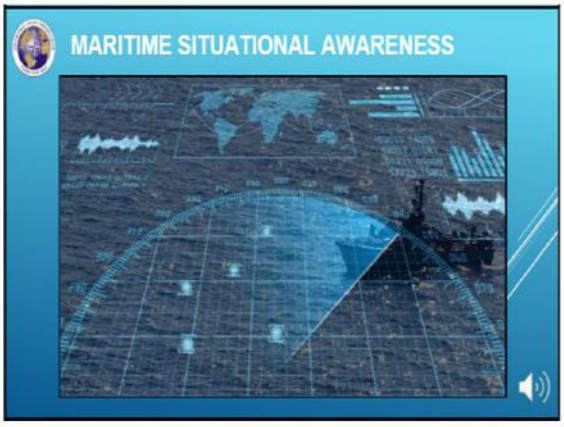

ADVERSARIES & ISR


NEAR PEERS & ISR


PERSISTENT COMMAND RELATIONSHIPS


ROBUST COMMAND & CONTROL
SEA BASE


PERSISTENT FORWARD PRESENCE


MARITIME SITUATIONAL AWARENESS


OPTIONS FOR RESILIENCE
Wake of Russian Submarine Leaving Naval Base
RFGeo


SEA CONTROL, POWER PROJECTION, DETERRANCE
Deterrent Lethality = Capability + Capacity + Readiness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www.cjoscoe.org
@CJOS_COE
https://www.linkedin.com/groups/12242340/

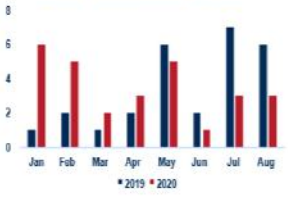
DR.DIRK SIEBELS

Changing threats?

BBC

Coronavirus: Piracy incidents double across Asia during pandemic

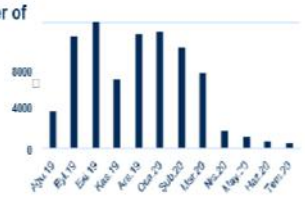
Maritime security incidents in the Straits of Malacca and Singapore



RiskIntelligence

Changing threats?

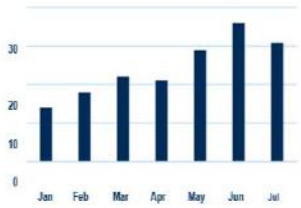
- Other maritime security-related issues may be influenced by Covid-19, but generally too early to assess
- Example: 12000 Number of migrants registered in Yemen after crossing the Gulf of Aden



RiskIntelligence

Changing threats?

- Other maritime security-related issues may be influenced by Covid-19, but generally too early to assess
- Example: 40 Interdictions of contraband smuggling at sea in the IFC Area of Interest



RiskIntelligence

Changing threats?

RiskIntelligence

Changing threats?

RiskIntelligence

Changing threats?

RiskIntelligence

Changing threats?

RiskIntelligence

Agenda

Background

Long-term outlook

Summary / Recommendations

RiskIntelligence

Long-term outlook

- Maritime security challenges will remain and continue to evolve
- Various factors to be considered, ranging from local law enforcement to geopolitical developments
- Influencing factors change over time, sometimes on short notice

RiskIntelligence

Long-term outlook

RiskIntelligence

Long-term outlook

- Impact on tourism highlights potential challenges

Contribution of tourism sector to GDP

RiskIntelligence

Long-term outlook

- Other global factors to consider, e.g. price levels for crude oil and other natural resources
- National / regional impacts of pandemic vastly different (e.g. economic impact, law enforcement capacities)
- Pandemic may lead to / accelerate changes (e.g. digitalisation, re-organisation of supply chains) with impact on maritime sector

RiskIntelligence

Agenda

Background

Long-term outlook

Summary / Recommendations

RiskIntelligence

Summary

- No short-term, direct impact from Covid-19 on security threats at sea
- Long-term impacts are possible and should be monitored, but currently too early to assess
- Tasks for navies are unlikely to be reduced; navies and other maritime agencies may have to ‚do more with less'

RiskIntelligence

Recommendations

- Establish / update contingency plans; be better prepared for the next emergency
- Establish / formalise cooperations to ‚outsource' traditional responsibilities and concentrate on core naval tasks
- Embrace technology / innovative solutions, e.g. cooperation with non-governmental organisations and the private sector

RiskIntelligence

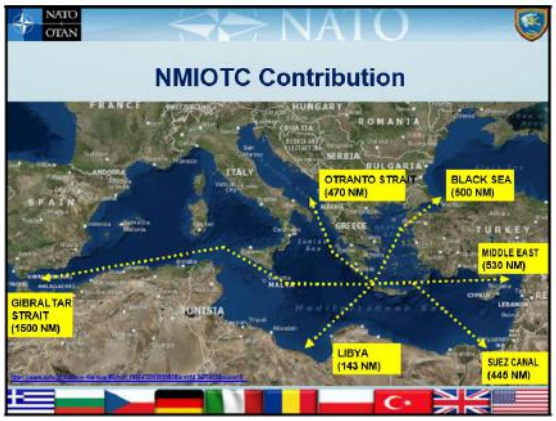
Outlook on maritime security challenges in a pandemic environment

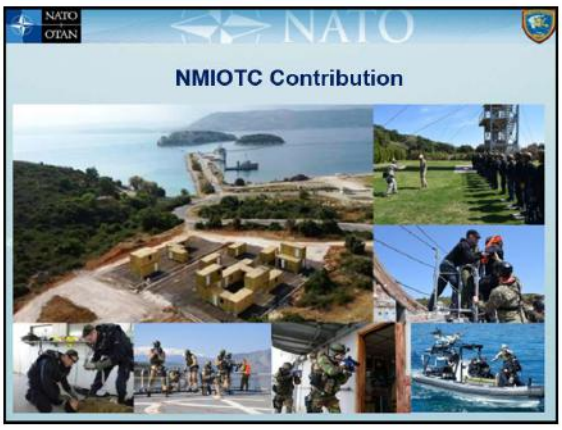
Dr. Dirk Siebels
Senior Analyst

dsi@riskintelligence.eu
Twitter: @dirksiebels

COMMODORE PANAGİOTİS PAPANİKOLAOU (GRC N)

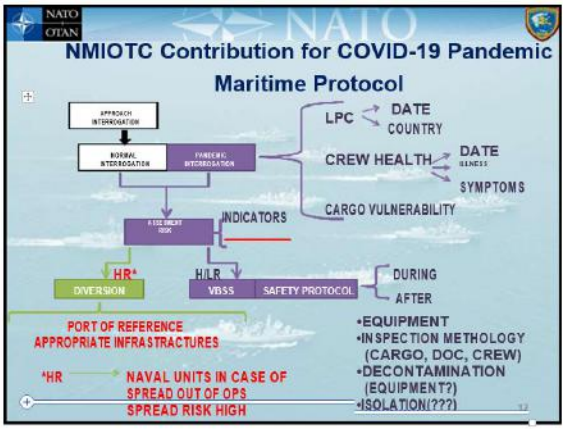

NATO
OTAN
Current Maritime Threats
• Maritime Terrorism
• Illegal Immigration
• Illicit Trade
Arm Smuggling
Human Trafficking
• Intelligence Threat
• Critical Infrastructure


NATO
OTAN
NMIOTC Contribution
OTRANTO STRAIT (470 NM)
BLACK SEA (500 NM)
MIDDLE EAST (530 NM)
GIBRALTAR STRAIT (1500 NM)
LIBYA (143 NM)
SUEZ CANAL (446 NM)


NATO
OTAN
NMIOTC Contribution


NATO
OTAN
NMIOTC Contribution
WMD
CBRN
CIED-IEDD
CIED- Force Protection
WIT
Combat Medical
Biometrics
Cyber Defense
Gender Cultural
Pandemic Response


NATO
OTAN
NMIOTC Contribution for COVID-19
• Situation
Unpredicted development
Significant implications on NATO Missions/ Activities
• Response
Commence Training iaw safety protocols LL
& Observations Analysis Forum
Advice on Implications on MIO Activities
Propose TPPs and Measures for safe MIO
Pandemic Response

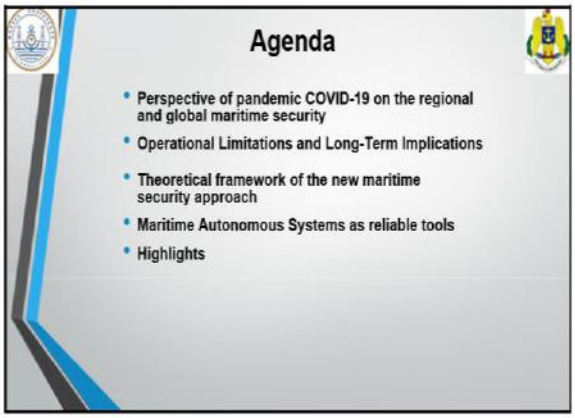

NATO
OTAN
NMIOTC Contribution for COVID-19 Pandemic
Maritime Protocol
LPC
DATE
COUNTRY
CREW HEALTH
DATE
SYMPTOMS
CARGO VULNERABILITY
INDICATORS
HR*
DIVERSION
HILR
VBSS
SAFETY PROTOCOL
DURING
AFTER
PORT OF REFERENCE
APPROPRIATE INFRASTRACTURES
*HR
NAVAL UNITS IN CASE OF
SPREAD OUT OF OPS
SPREAD RISK HIGH
•EQUIPMENT
•INSPECTION METHOLOGY
(CARGO, DOC, CREW)
•DECONTAMINATION
(EQUIPMENT?)
•ISOLATION(???)

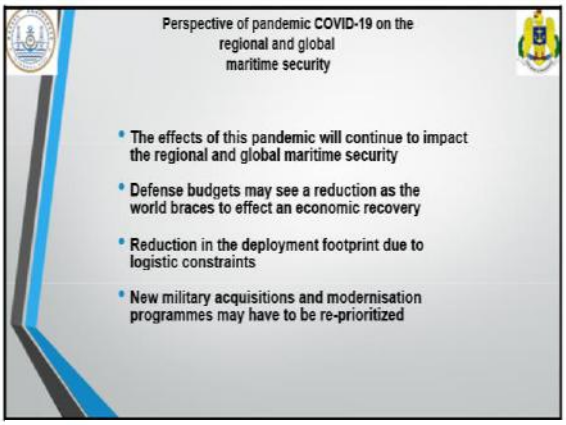

NATO
OTAN
NMIOTC Contribution for COVID-19
• Tactics - Procedures
Diversion Ports – Installations
Questionnaires – Decision
making Port of Call - Bill of Health
• Measures - Techniques
Protective Gear
Opposed – Unopposed
Boarding Crew handling
Boarding Team
World Health Organization

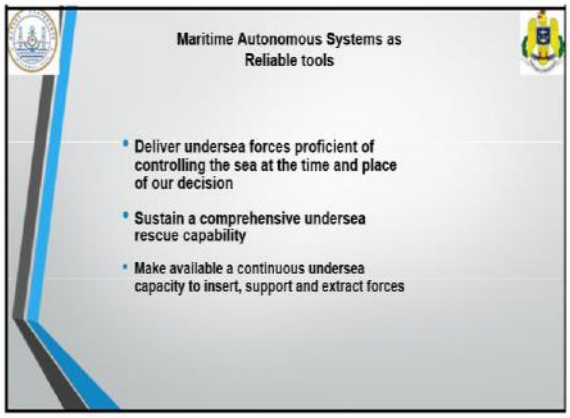

NATO
OTAN
Shaping the Future
• Remain the Paramount Maritime Security Training Provider
Safely commence post lock-down Operation
Continuously investigate training needs/
gaps Develop necessary training tools
• Engage with Maritime Community/ Industry
• Maritime Terrorism/ Emerging threats

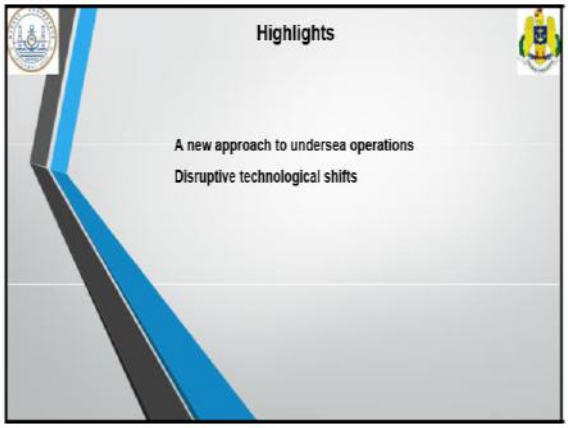

NATO
OTAN
"We have land and country when we have ships sailing at sea"
Themistocles 480 BC, Battle of Salamis

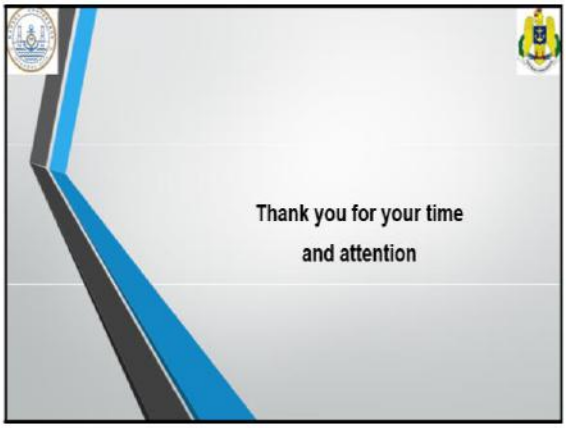
CAPT.DANIEL CORNEL TANASESCU (ROU N)











DR.KEIKO KONO

A case study of the dispute in South China Sea: an approach by claimant countries and ASEAN and its impact on maritime security in the region

Keiko Kono

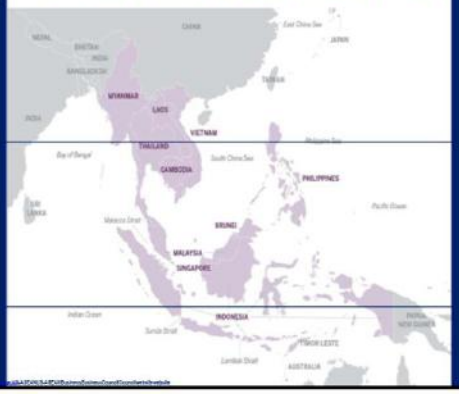
Law Researcher,
NATO Cooperative Cyber
Defence Centre of Excellence

CCDCOE

ccdcoe.org
@ccdcoe

1/9

ASEAN IS AT THE CENTER OF A DYNAMIC ASIA PACIFIC REGION



2/9

Efforts to tackle the South China Sea dispute

- ASEAN and China signed the Declaration on the Conduct of Parties in the South China Sea (DOC) in 2002.
- China's attempt to change the status quo by force in the South China Sea continued. e.g. incidents between Vietnam and China
- Ruling by the arbitral tribunal based on the UNCLOS in 2016 (Philippines v. China) : denial of any legal basis for China-claimed historic rights over the waters.
- China call the ruling "illegal, null and void and has no binding force" and intensifies militarization of the area.
- Claimant states and Indonesia sent letters of protest to UN.

Source: the Conversation website

3/9

"Island" or "rock" in the South China Sea?

Article 121 UNCLOS

1. An island is a naturally formed area of land, surrounded by water, which is above water at high tide.
2. Except as provided for in paragraph 3, the territorial sea, the contiguous zone, the exclusive economic zone and the continental shelf of an island are determined in accordance with the provisions of this Convention applicable to other land territory.
3. Rocks which cannot sustain human habitation or economic life of their own shall have no exclusive economic zone or continental shelf.

4/9

Security Challenges posed in the South China Sea

De facto effective control by China over the South China Sea poses challenges in both maritime domain and cyber domain.

- sovereign rights of coastal states in their EEZs/Continental Shelfs and high sea freedoms for every states : navigation, military activities
- impact on cyber physical infrastructures (protection of undersea cables)

Source: Submarine Cable Map website

5/9

China's surveillance ops in the South China Sea

PLAN and Chinese fishermen (maritime militia) engage in maritime surveillance activities against other maritime countries by hunting underwater drones and operating their drones around South China Sea

e.g. Seizure of American UUV in December 2016.

"A screengrab of a Chinese TV report on the drone findings by Chinese fishermen". Source: BBC

Chinese fishermen were awarded for finding "spy drones". Source: BBC

6/9

The 36th ASEAN Summit (26 June 2020)

Chairman's Statement of the Summit

"We were encouraged by the progress of the substantive negotiations toward the early conclusion of an effective and substantive Code of Conduct in the South China Sea (COC) consistent with international law, including the 1982 UNCLOS. We welcomed the completion of the 1st reading of the Single Draft COC Negotiating Text." (para. 64.)

"concerns were expressed on the land reclamation, recent developments, activities and serious incidents, which have eroded trust and confidence, increased tensions and may undermine peace, security and stability in the region." (para. 65.)

CCDCOE

7/9

ASEAN nations under the pandemic

- Overall, ASEAN nations are less affected by Covid-19 compared to other regions
- They rely on "mask diplomacy" by China (donation of masks and hand sanitizers and ASEAN and individual countries in Southeast region)
- The pandemic delayed the negotiation for COC in the South China Sea

CCDCOE

8/9

Takeaway

- China's de facto effective control over the South China Sea remains the same after the arbitral ruling of 2016.
- The process of negotiating legally binding the COC in the South China Sea in ASEAN is delayed but still underway.
- There are ongoing security challenges in both maritime and cyber domains in the region. However, as China already has a strong presence in the region in terms of economy, ASEAN nations don't welcome an escalation of the dispute.

CCDCOE

9/9

Thank you!

↑ Jan. 2006 Apr. 2015 ↑

CCDCOE

Yongshu, Spratly Islands, South China Sea
Source: AFP BB News

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GÖZDE BOZTEPE KARATAŞ

HAVELSAN

Advanced Analysis and Fusion Systems for Improved Risk Analysis at Sea

Gözde Boztepe Karataş
gboztepe@havelsan.com.tr

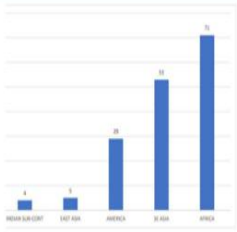
HAVELSAN

Content

- Introduction
- Vessel Route Anomaly Detection
- Conclusion

HAVELSAN

Introduction



ICC International Maritime Bureau,
Piracy Reporting Centre
- Annual Piracy Report, 2019
- 162 incidents

HAVELSAN

Introduction

IMB's Piracy Reporting Centre
- Piracy Report, January – June 2020
- 98 incidents

HAVELSAN

Introduction

- The main objective is to develop an integrated maritime surveillance system
- Vessel Route Anomaly Detection aims to assist operators by detecting anomalies that may be missed by operators
- Route Aware aims to enhance situational awareness and reaction capability with behavioral analysis and anomaly detection of vessels

HAVELSAN

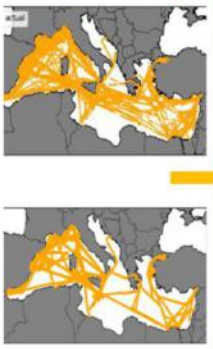
Vessel Route Anomaly Detection

- Helping safe navigation
- Historical AIS dataset
- Route Extraction
- Anomaly Detection

Vessel Route Anomaly Detection

Route Extraction:

- Historical AIS data
  - 3 months of Mediterranean data
- The route patterns are extracted with the newly developed algorithm.
  - Python, MongoDB
- The extracted routes are stored in the database.
- Each route are analysed for speed and course statistics to use in anomaly detection.
  - Java, Python, MongoDB



Vessel Route Anomaly Detection

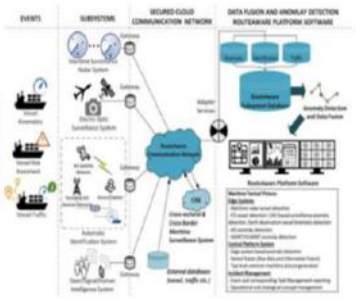
Examples of anomalies:

- not following the expected routes
- meeting two or more vessels at the same point
- heading towards a different port than destination port
- not arriving destination port in arrival time
- not broadcasting information in conformity with AIS data update frequency
- incompatibilities of speed and position information
- very low speed value
- unexplained high speed value

RouteAware

- European Union Research and Innovation programme – Horizon2020
- Improved risk analysis
  - Vessel tracking, behaviour analysis and automatic anomaly detection

Route Aware



RouteAware

RouteAware

- Integrate a complete vessel and ownership database, such as Lloyds List etc.
- Integrate satellite imagery (SAR and Optical).
- Integrate voyage information (declared next port of call, ETA, etc.).
- Integrate global AIS data, coastal, satellite and other radar/ EO information.
- Integrate confidential information (databases, crew records etc.).
- Locate a ship with Satellite systems.
- Detect transfers between large and small radar contacts in open waters.
- Classify ships departing from a particular port.
- Warn border security users about an abnormal length of stay in an area.

Conclusion

- Maritime safety is crucial
- Need for a tool to support the operator
- Too much stream data
- Having a tool that captures and reports violations

Thanks for your attention

References

- "Piracy Report January – June 2020", The International Chamber of Commerce [Online]
  - https://www.icc-ccs.org/index.php/1293-crew-kidnappings-surge-in-seas-off-west-africa-imb-
- "Annual Piracy Report 2019", The International Chamber of Commerce [Online]
  - https://www.icc-ccs.org/piracy-reporting-centre/
- "The Vessel route pattern extraction and anomaly detection from AIS data " 2019 Gözde Boztepe, Supervisor: Prof. Dr. Pınar Karagöz

SAM ZWOLINSKI

Rising Temperatures, Rising Tensions, Rising Seas

How can navies serve their countries at the start of a transformative decade?

Sam Zwolinski
Operational Analyst
UK Maritime Warfare Centre (MWC)

Introduction

- Failures in governance combine with unforeseen factors to exacerbate crises; a vicious spiral of poor solutions creates further problems.
- Credible naval forces are a strategic enabler.
- All nations, regardless of geological fortune, depend on the sea.

Coronavirus Overview

Image: US Naval Institute News

Rising Tensions

Date	Incident
13th June	Attacks on KOKUKA COURAGEOUS and FRONT ALTAIR
20th June	Iranian downing of USN Unmanned Aerial System (UAS)
4th July	Boarding of GRACE 1 (since renamed ADRIAN DARYA-1) near Gibraltar
10th July	Attempted Iranian seizure of MV BRITISH HERITAGE
18th July	USS BOXER's downing of an Iranian UAS
19th July	Iranian seizure of MV STENA IMPERO in Strait of Hormuz (SoH)

Oil Market Volatility

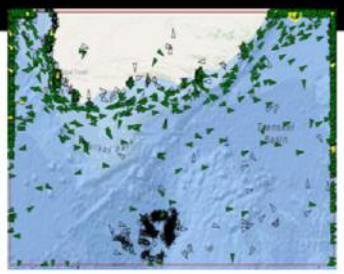
"April 2020 will be remembered as the bleakest month in the history of oil markets in terms of balances and prices."

— Bassam Fattouh , Andreas Economou
Oxford Institute for Energy Studies

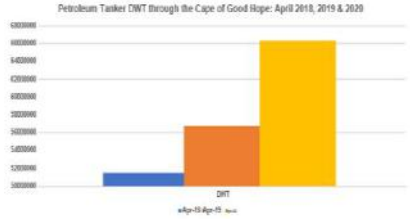
Oil Market Volatility

Month	Tankers through...	
	Suez Canal	Cape of Good Hope
Jan 20	289	271
Feb 20	279	292
Mar 20	284	288
Apr 20	338	334
May 20	306	355
Jun 20	222	314
Jul 20	205	373
Aug 20	192	329

Oil Market Volatility



Oil Market Volatility



Oil Market Volatility

Compared to Suez, the Cape of Good Hope showed:

- Higher bump in traffic as measured by DWT
- Deeper fall after lockdown

Oil Market Volatility

Image: AFP / BBC

Oil Market Volatility

Tactical level questions presented by COVID-19:

1. What is the risk that boarding a civilian ship will lead to COVID-19 being spread to my warship?
2. How does the possible presence of coronavirus affect the calculation of proportional armament and posture of warships and boarding teams?
3. Do standard boarding tactics apply in the context of a tanker being sent between two nation states?

Climate Change & Migration

- Rising temperatures
- More droughts and heatwaves (leading to wildfires)
- Longer, stronger and more frequent hurricanes
- Rising sea levels

— NASA, Intergovernmental Panel on Climate Change (IPCC)

Conclusion

Positive opportunities will emerge from these crises.

Navies that seize them will enable themselves to fulfil their duties safely and justly.

SPEAKERS' PROFILES

SPEAKERS' PROFILES

16 September 2020

Opening Session

Capt. Sümer KAYSER (TUR N), NATO MARSEC COE Director

Sümer Kayser was born in İzmir, Turkey in 1969. He received his B.Sc. degree in Operational Research Management (OPR) from the Turkish Naval Academy, İstanbul, Turkey, in 1990. He assumed a variety of duties during his sea tour between 1990 and 2002. He worked at Turkish Naval Forces HQ (Ankara) between 2002 and 2012. He worked in Multinational Maritime Security Centre of Excellence-MARSEC COE as a Head of Transformation Department between September 2012 and May 2013 and as the Deputy Director between May 2013 and March 2017. Currently, he is working at MARSEC COE as Director. He is an MA student in International Security and Strategic Studies Program at MEF University-İstanbul.

Vadm. Keith BLOUNT, CB OBE Royal Navy Commander

Keith Blount is the Commander of NATO's Allied Maritime Command. He is NATO's principal maritime adviser and has operational Command of NATO's Standing Naval Forces. He joined the Royal Navy in 1984 as a helicopter pilot. He received his wings in 1986 and was a front line aviator at the age of 20. Through a varied flying career, he qualified as an instructor and flew in the Royal Navy Helicopter Display Team. Blount has blended his aviation experience with a broad span of Command. He has commanded three warships, including the helicopter carrier HMS OCEAN and sailed in NATO Task Groups during Operation Sharpguard and Operation Active Endeavour. He was the Iraqi Maritime Task Group Commander during Operation TELIC and, more recently, was the United Kingdom's Maritime Component Commander, based in Bahrain, spanning Operations in Syria and Iraq. His staff appointments have included three periods in the Ministry of Defence and his last London assignment was as Military Assistant to the Vice Chief of the Defence Staff. He holds a Master of Arts degree in Defence Studies and is a Fellow of the Royal Aeronautical Society. Appointed Officer of the Order of the British Empire in 2012, he was awarded an operational Legion of Merit by the President of the United States in 2016. Blount was appointed Companion of the Order of the Bath in 2018. Between 2015 and 2019 he was the Head of the Fleet Air Arm and the officer accountable for the Queen Elizabeth Class aircraft carriers. Having previously been Chief of Staff to the European Union Naval Force and Deputy Commander of the Combined Maritime Forces, he was appointed as the Commander of NATO's Maritime Command in May 2019.

Brig.Gen.Davide RE (ITA F), NSD-S HUB Director

Brig. Gen. Davide RE, ITA F NSD-S HUB Director CURRICULUM VITAE Brigadier General Pilot Davide RE was born in Milan on 16 August, 1969. After attending the Italian Air Force Academy from 1988 to 1992 he graduated from Federico II University, Naples, with a degree in Aeronautical Science cum laude. He obtained his Military Pilot License at Sheppard AFB ENJJPT in Texas, USA in September, 1992 on T-37 aircraft and the following July on T-38A aircraft. Post February 1994, he completed the transition to G-91 aircraft at the 32nd Wing in Amendola (FG), Italy and to TORNADO PA-200 aircraft at Cottesmore TTTE (Tri-National TORNADO Training Establishment) International School in the UK. Assigned to 6th Wing Ghedi (BS), Italy from 17 February 1994 – 2005, he was Flight Commander at the 102nd Squadron and achieved full Operational Roles and Qualifications for TORNADO Pilots including Formation/Package Leader, Chase, FCF (Functional Check Flight) and TORNADO Instructor. Returning to the ENJJPT in Sheppard AFB from 2005 to 2008, he was the Director of Operations (DO) at the 90th Squadron and Pilot Instructor for T-38 A/C aircraft. During this time he was awarded the Meritorious Service Medal by the AETC Commander (Air Education and Training Command). His next assignment was to the Air Force Staff HQ in November, 2008, where he was appointed Head of Doctrine and Future Concept until the end of February, 2009. From then until July 2009 he attended the 114th Course at NATO Defense College, Rome where he achieved the grade of "Exceptionally Well-Suited". He was the Project Officer at the Air Force Staff 3 Department (Operation, Plans and Transformation) from 21 September, 2009 until 17 May, 2010 within the JSF Program for Italian Staff. From 23 May until November 2010 he was assigned at the Regional Command West – H.Q as Joint Air Task Force Commander for ISAF Operation in Afghanistan. Re-assigned to the Air Force Staff 3 Department his duties were: - Air Force Staff Project Officer from 25 November, 2010 to 04 December, 2011; - Air Force Staff J.S.F. Working Group Representative; - Air Force Staff "Doctrine and Future Plans" Office Deputy Chief from December, 2011 to September, 2013. He was assigned to the 4th Department (Military Programs) of the General Defense Secretary/ National Armaments Directorate, as the Head of the Aeronautical Programs Office from September 2013 until August 2015. In September 2017 he was made DCOS (Deputy Chief of Staff) at Air Command, Rome until 28 September, 2018 when he became the Italian Joint Cell SNR (Senior National Representative) at the US CENTCOM in Tampa, Florida with the rank of Brigadier General until 13 October, 2019. Since the 11 November 2019, he has been appointed the duty of NSD-S (NATO Strategic Direction – South) Hub Director in JFC Naples. Brig. Gen. Davide RE has over 2,700 hours of flying time in 6 different aircraft; SF260, T-37, T-38A, T-38C, G-91T and Tornado PA-200 (IDS–Interdiction Strike and ECR–Electronic Combat Reconnaissance).

During his career to date he has been awarded different medals including the Aeronautical Military Medal for Long Air Navigation First Grade (Gold), the Bosnia Commemorative Cross, the Gold Cross for Service Experience (25 years), the Former-Yugoslavia NATO Medal, the First Level Bronze Award for Wartime Operations (Fighter Role), the Bronze Medal Award as Commander, the Meritorious Service Medal, the Italian Republic Medal of Merit and others. During his career to date he has been awarded: - Aeronautical Military Medal for Long Air Navigation First Grade (Gold); - Bosnia Commemorative Cross; - Gold Cross for Service Experience (25 years); - Former-Yugoslavia NATO Medal; - Kosovo NATO Medal; - First Level Bronze Award for Operations (Fighter Role); - Bronze Medal Award as Commander; - Afghanistan Commemorative Cross Medal; - NATO non-Article Five Operations in Afghanistan; - Meritorious Service Medal; - Italian Republic Medal of Merit. He is married to Mrs. Ilaria DEGL'INNOCENTI and has a 9-year-old daughter, Vittoria.

Panel-I (Overview of Maritime Security Challenges)

Dr. Dirk SIEBELS

Dirk Siebels is a Senior Analyst at Risk Intelligence, a Denmark-based security intelligence company where he is responsible for analysis on countries in sub-Saharan Africa. He holds a PhD from the University of Greenwich in London. His research concentrates on maritime security issues in sub-Saharan Africa, including the role of ports and maritime trade, IUU fishing, offshore energy production and the evolution of private maritime security providers. Dirk has contributed to a number of research projects, including the annual State of Piracy report by Oceans Beyond Piracy (now Stable Seas). He is an academic advisor for the Turkish Navy's Maritime Security Centre of Excellence (MARSEC COE), part of the expert network for CEMLAWS Africa, a Ghana-based think-tank, and has recently published a book that includes many aspects of his research.

Prof. Christian BUEGER

Christian Bueger is Professor of International Relations at the Department of Political Science, University of Copenhagen. He is also an honorary professor of the University of Seychelles, a research fellow at the University of Stellenbosch and the Co-Director of the Safe Seas network.

Previously he was professor of international relations at Cardiff University and held visiting fellowships at the National University of Singapore (2015 & 2018), University College London (2015) and the University of Copenhagen (2013 & 2014). He was a Leverhulme Fellow at the Greenwich Maritime Institute, London (2011) and a research fellow at the Institute for Development and Peace, Duisburg, Germany (2010).

Professor Bueger is the author, co-author and editor of several books and articles on global governance, maritime security, and contemporary maritime crime. In his current grant funded projects he is studying regional responses to maritime crime in the Indo-Pacific and maritime security practices in Ghana. His research has been funded by the UK's Economic and Social Research Council (ESRC), the British Academy, the Leverhulme Trust Fund, and the Danish Development Agency (DANIDA). In 2013 he was recipient of an ESRC future research leader award.

He was the lead editor (Europe) of the European Journal of International Security (Cambridge UP) from 2014 to 2019, and the founding editor of piracy-studies.org – the research portal for maritime security (until 2019). Actively combining research with practical work he regularly acts as consultant and speaker at conferences on international policy, maritime security and transport security. His research has featured in different media, including, among others, ITV, The Guardian, Africa Renewal, Veja or The New Internationalist.

He obtained his PhD in Political and Social Sciences from the European University Institute, Florence, Italy (2010). During his PhD studies, he was a visiting researcher at Cornell University and a research assistant to the European Report on Development 2009. He priorly graduated as a Diplom-Politologe from the Goethe University Frankfurt am Main and worked as a research assistant at the Institute for Social Research, Frankfurt am Main and the Peace Research Institute Frankfurt.

Dr. Emre BAYSOY

Asst. Prof. Dr. EMRE BAYSOY He was born in 1980 in Istanbul, Üsküdar. He graduated from TED Ankara College in 1998. In 2002, he completed his undergraduate degree at Başkent University, Political Science and International Relations Department. Between 2003 and 2006 he got his master's degree at METU Department of International Relations with the thesis entitled "The Political Economy of Development in a Historical Context: International Experiences and Turkey". At the department of National and International Security Strategies, which started in 2007 at the Institute of Strategic Research of the Military Academy, he completed his PhD degree in 2012 with the thesis entitled "Revolving Geopolitics of the Eastern Mediterranean in the Context of Regionalism". He started his career as a research assistant in Namık Kemal University, Faculty of Economics and Administrative Sciences, Department of International Relations. Assoc. As on duty. Some of his published articles are "Strategic Importance of the Rail Ways", "Political Economy of Energy within the Framework of Russia, EU, and USA Relations and Geopolitics of Globalization", "Political Economy of the Water at the World and at Turkey" "World System and the Globalization", "New-Regionalism: The Slipknot of the Two Rival Trends?, "The Death of the Security Goddess Securitas: Brave New World", "New Regionalism: The Slipknot of the Two Rival Trends?", "Eastern Problem on the Axis of Modernization and Geopolitics" and "Terrorism as a (De)Securitization Instrument". He is the author of the book "Wavy Geopolitics of the Eastern Mediterranean: From Modern Region to Post-Modern Levant"

Cdr. Andreas KUTSCH

Born in 1964, Cdr. Kutsch joined the German Navy in1983. After preliminary training and education including a Master Diploma in Educational Science he was command-qualified and served as a Commanding Officer on different German Fast Patrol Boats.

Thereafter Cdr. Kutsch for about nine years was appointed to GBR, including times in the Royal Navy Battle staff, 2 years as a Training Officer at the RN School for Maritime Operations, before running through the British Staff College and serving at the NATO Maritime Headquarters in Northwood.

After further staff appointments back in Germany he commanded a small training battalion at the German Navy CPO –school, and since Jan 2017 he has been a member of the COE CSW in Kiel. His operational record comprises Operation Allied Force (Kosovo), Operation ATALANTA as a Division Head in the Operation Headquarters in London, and commanding the 21st German Contingent to Operation UNIFIL in Lebanon.

Flotilla Admiral Prof. Dr. DSC Boyan MEDNIKAROV

The Rector of Nikola Vaptsarov Naval Academy, Professor of Military-Political Aspects of Security, the Chairman of the Scientists' Union in Varna, the member of the Management Board of the Bulgarian Union of Scientists and an active public figure.

Flotilla Adm. Prof. Boyan Mednikarov, D.Sc. graduated first in class in the Naval Academy in Varna, specializing in naval shipping guidance. He started his service at the light infantry brigade in the city of Sozopol, as Commander of a rocket launcher. Subsequently, he went through the positions of Assistant Commander, Ship Commander, Commander of a tactical group of ships, the Chief of division of ships. The Admiral Kuznetsov Naval Academy in St. Petersburg awarded him a gold medal, when he obtained his first Master's degree in 1992.

During his extensive professional career, he has held the positions of a Senior Assistant Chief of the Operations Division at the Navy Headquarters in Varna, the Deputy Head of the Operational-Tactical Department of the Postgraduate Qualifications Center at the Naval Academy, the Head of the Naval Forces Department at the Military Academy. Between 2001 and 2011, he was the Deputy Head of the Educational and Scientific Section of the Naval Academy in Varna. Since May 2011, he has been the Rector of the Academy.

In 1999, he completed his Doctorate degree and later became an Associate Professor of Armed Forces Organization and Management. Flotilla Adm. Prof. Mednikarov has his second Master degree in Strategic Leadership of Defence and Armed Forces from the Military Academy in Sofia. He has a second PhD in Military-Political Aspects of Security. Since 2009, Flotilla Adm. Prof. Mednikarov has been a Professor in the same academic field.

Prof. Mednikarov was the chairman of the Scientists' Union in Varna. He was a winner of the Varna Award for Science in 2008 in the field of social sciences. He was awarded the 2014 Prize of the Bulgarian Marine Chamber St. Nicholas for personal contribution in the development of marine science and education. Honorary Professor of the Naval Academy Mircea cel Batran, Constanta, Romania. Awarded with the Honorable Golden Order "Merit to Varna" in 2016 for the overall contribution to the development of marine education and science. Winner of the 2016 Black Sea Medal Awards for the long years of work in the field of conservation and improvement of the Black Sea environment. He was awarded a Doctor Honoris Causa Degree by Todor Kableshkov University of Transport, Sofia.

Areas of expertise: Defence and Strategic Studies, Maritime Security and Safety, Maritime Education System, Leadership and Management in Shipping.

Assoc.Prof. Siyana LUTZKANOVA

The lecturer at the Nikola Vaptsarov Naval Academy, the Atlantic club of Bulgaria and the International Institute for Migration and Security Research. The former expert at the Bulgarian Ministry of Defence. Member of the Scientists' Union in Bulgaria

Assoc. Prof. Siyana Lutzkanova's teaching career has commenced at the Peace Research Institute Frankfurt (PRIF)/Hessische Stiftung Friedens und Konfliktforschung (HSFK)/under a project of the US foundation McArthur. She is currently teaching at the Nikola Vaptsarov Naval Academy in the Department of Organization and Management of Military Units at Tactical Level. She obtained her PhD degree in Maritime Policy and Maritime Security from Nikola Vaptsarov Naval Academy. The lecturer at the Atlantic club of Bulgaria and the Diplomatic Institute to the Minister of Foreign Affairs.

Assoc. Prof. Lutzkanova, PhD had been an expert at the Bulgarian Ministry of Defence for six years and gained strong international experience. She was an active participant in the negotiation process between the Bulgarian and the US governments in the field of defence cooperation. She participated in a number of international projects such as Maritime Education Network to Orient and Retain Women for Efficient Seagoing Services, Maritime Security Awareness aiming at developing a joint Master Degree Programme between Nikola Vaptzarov Naval Academy, Bulgaria and Konstanta Maritime University, Romania as well as in the project Integrated Information System in Support of Coastal Zone Management.

Assoc. Prof. Siyana Lutzkanova, PhD is a member of the Scientists' Union in Bulgaria, of Sofia Security Forum and a member of the Alumni George C. Marshall European Center for Security Studies, Garmisch-Partenkirchen, Germany.

Areas of expertise: Black Sea Security, National and Maritime Security, NATO and EU Policies, International Maritime Organizations, international Disarmament and Arms Control Regimes

Assoc.Prof. Sercan EROL

Sercan EROL was born in 1983 in Trabzon. He graduated from Trabzon High School in 2000 and from the Faculty of Economic and Administrative Sciences of Karadeniz Technical University in 2005. He started to work as a lecturer in KTU Mari Department. EROL, completed his master's degree in marine accidents and insurance, and worked on maritime economics and finance in his doctoral studies. He has national and international publications on his rese Marine Transportation and Management Engineering Department. In addition to his academic activities, Erol was also interested in mountaineering and served as a Club President and Federation Provincial Representative of Turkey. Erol has already been working as the Executive Board Member of Turkish Mountaineering Federation. He is married and has 2 children.

Field of study:

- Marine Accidents and Insurances
- Maritime Law
- Maritime Economics Some publications
- Erol S., Demir M., Çetişli B., Eyübo Strait Using Neuro-Fuzzy and Genetically Optimised Fuzzy Classifiers", JOURNAL OF NAVIGATION, vol.1, no.1, pp.1.
- Erol S., "Calculation of the freight revenues Maritime Policy & Management, vol.44, pp.815.
- Uğurlu Ö., Erol S., Başar E., "The analysis of life safety and economic loss in marine accidents occurring in the Turkish Straits", MARITIME POLICY & MANA vol.43, pp.356-370, 2016.
- Erol S., Başar E., "The analysis of ship accident occurred in Turkish search and rescue area by using decision tree", MARITIME POLICY & MANAGEMENT, vol.42, pp.377 388, 2015.
- Başar E., Köse E., Erol S., "Effects of Sports Study on Turkish Maritime Officers and Cadets", JOURNAL OF SPORT AND HEALTH, vol.6, pp.9-15, 2015.
- Erol S., "The impact of distance and narrow waterway on voyage cost: Cost formulation and an implementation on dry pp.49-59, 2016.
- Basar, E., Erol, S. “Determination of Tanker Ship Traffic and Traffic Accident Forecast in the Black Sea Area” 8. National Congress of Turkey's Coastal and Marine Areas, Vol.3, pp 1401-1408, 2010.

Panel-II (Ongoing and/or Potential Impacts of the Covid-19 Pandemic on Maritime Security Challenges)

Mr. Brian WILSON

Brian Wilson serves as the Deputy Director of the Global MOTR Coordination Center (GMCC), the U.S. Government's interagency maritime threat response office. He is also a Visiting Professor at the U.S. Naval Academy and a non-resident fellow at the Stockton Center for International Law at the U.S. Naval War College.

Brian has advised and supported U.N. agencies, NATO Centres of Excellence, and governments across the globe on coordination, crisis management, and maritime law enforcement. He led interagency efforts within the Maritime Operational Threat Response (MOTR) Plan to draft national-level policy to integrate responses to maritime cyber events, piracy, and illegal fishing. He is the principal author of pioneering information sharing agreements to bridge whole-of-government frameworks involving several countries. He is also a Seminar XXI Fellow of the Massachusetts Institute of Technology and a Fulbright Scholar (Visiting Professor of Law at Tbilisi State University Law School). Brian has written on maritime security in the Stanford Journal of International Law, Texas International Law Journal, Emory International Law Review, and Harvard National Security Journal, among others.

He had served for more than twenty years as an officer and lawyer in the U. S. Navy, whose assignments included Oceans Policy Adviser to the Under Secretary of Defence for Policy, the Commanding Officer of the Region Legal Service Office Naval District Washington, and the Special Assistant to the General Counsel of the Navy. He may be reached at brianstwilson@gmail.com.

Mr. Brian F. Eggleston

Brian Eggleston is the Portfolio Director for International Partnership at the National Maritime Intelligence-Integration Office (NMIO) / National Intelligence Manager (NIM) for Maritime. He also covers Aviation/Maritime Domain Integration, having previously served as the founding Deputy Director of the National Aviation Intelligence Integration Office (NAI2O) / NIM for Aviation.

Brian was assigned to NAI2O in March 2015 to assist in standing up the new entity after over 5 years as the Strategic Engagement Department Head for NMIO, where he led its outreach and communication programs. Prior to this, he was the senior policy developer for the Global Maritime & Air Intelligence Integration (GMAII) section of the Office of the Director of National Intelligence (ODNI), supporting improved intelligence integration throughout aviation, maritime, and transmodal transportation domains. All aforementioned

positions further the mission of dynamically integrating the Intelligence Community and improving information sharing efforts amongst U.S. U.S Federal, state, local, tribal, and territorial governments, law enforcement, non-governmental organizations, academia, private, industry, and international partners to create whole of nation unity of effort to improve aviation and maritime security.

Brian joined ODNI following 25 years of active duty in the U.S. Air Force and Navy, 21 years of which included service as a tactical, operational, and strategic Naval Intelligence Officer and East Asia & Pacific Foreign Area Officer. Highlights of his military career include assignments with the Defense Intelligence Agency; an integrated assignment with the Royal Australian Navy as its Deputy Commander for Intelligence; and with the United Nations as the Chief of Military Intelligence and the Senior U.S. Military Observer for the U.N. Stabilization Mission in Haiti.

He is a recipient of both the National Intelligence Superior Service Medal and the Military Intelligence Corps Associations' Knowlton Award, earned a Master of Science of Strategic Intelligence from the National Intelligence University, is a distinguished graduate of the U.S. Naval War College, and was awarded a certificate for the Senior Executives in National and International Security Program, John F. Kennedy School of Government at Harvard University, Executive Education.

Lieutenant Colonel Bernd ALLERT

Current Assignment (since 1 October 2016)

Chief Doctrines & Terminology Section / Joint CBRN Defence Centre of Excellence

Chairman (JCBRND-CDG) Doctrine & Terminology Panel (DTP)

Previous Assignments

Deputy Chief (from May 2013 – November 2015: Acting Chief) / Section International Cooperation

2013-2016 Bundeswehr CBRND Cmd, BRUCHSAL/DEU

DEU Dep Rep Joint CBRND Capability Development Group (JCBRND-CDG)

DEU Rep (JCBRND-CDG) Doctrine & Terminology Panel (DTP) [until July 2015]

Acting/Chairman (JCBRND-CDG) Doctrine & Terminology Panel (DTP) [since July 2015]

Chairman (JCBRND-CDG) Team of Experts "CBRN 2020"

CBRN Expert (Voluntary National Contribution)

2008 – 2013 NATO HQ – IS/ESC (WMDC), BRUSSELS/BEL

Deputy Chief Force Protection / Chief CBRN Defence

2005 – 2008 ALCC HQ HD, HEIDELBERG

Section Head CBRN Defence

ALCC HQ HD Rep CBRN OPS WG (MCJSB), CBRN TRG WG (JSSG/NTG)

Joint Capabilities Group on CBRN Defence (NAAG)

SO International Co-operation

2002 – 2005 Joint Support Command, COLOGNE

Bilateral co-operation with PfP / MD countries

DEU Rep (EU) ECAP CBRN Working Group

DEU Rep CFR WG (MCASB)

DEU Rep NBC Training Working Group (JSSG/NTG)

Deputy Chairman/Secretary NBC Training Working Group (JSSG/NTG)

1999-2002 Course Director Environmental Protection, NBC Def School, SONTHOFEN.

1997-1999 SO Controlling, 750 NBC Def Bn, BRUCHSAL

1994-1997 SO NBC Def Trg, Army Office, COLOGNE

1991-1994 Coy Cdr HQ Coy/30 Armoured Bde, ELLWANGEN

1988-1991 NBC W&R Offr, HQ 1 Corps, MUENSTER

1982-1988 Plt Cdr, S2 Offr, Coy Cdr, 110 NBC Def Bn, EMDEN

On active duty for (DEU) Bundeswehr: since 1 July 1977.

Education and Training

2006 NATO Operational Planning Course, NATO School, OBERAMMERGAU.

2000 Land Forces Command & Control Course, AOS, DRESDEN.

1996 Armed Forces Command & Control Course, Staff College, HAMBURG.

1978-1982 Studies of Economics of Management, Armed Forces University, HAMBURG; Degree: Diplom-Kaufmann.

Deployments

7/2007 -1/2008 Deputy Chief Theatre Force Protection, HQ, ISAF, KABUL.

7/1999 – 9/1999 Liaison Offr MNB(S) to UÇK, PRIZREN/KOSOVO.

Publications

- Weapons of Mass Destruction Disablement, in: Countering Radiological and Nuclear Threats (ISBN 978-88-255-3153-4, 2019.

- NATO's Response to CBRN Events, in: Cyber and Chemical, Biological, Radiological, Nuclear, Explosives Challenges (ISBN 978-3-319-6207-4), Springer International Publishing AG, Cham 2017.
- Framework Nations Concept, in: BORDEAUXROT 3/2015, Sonthofen 2015.
- CBRN Training in Serbia, with Mr. Andy Oppenheimer, in: CBNW 2013/02, London 2013.
- NATO Crisis Management Exercise 2012, in: Crisis Prevention 1/2013, Bonn 2013.
- Mixing it up, in: CBRNe WORLD February 2013, Winchester 2013.
- NATO's CBRN Defence Policies and Activities, in: Defence Forces Technical Research Centre, 8th Symposium on CBRNe threats – How does society cope? (ISBN 978-951-25-2347-4), Tampere 2012.
- NATO Disease Surveillance Seminar, in: Wehrmedizin und Wehrphamazie 3/2011, Bonn 2011.
- NATO Disease Surveillance Seminar, in: Medical Corps International Forum 3-2011, Bonn 2011.
- Testing Times, in: CBRNe WORLD 4/2009, Winchester 2009
- Dance to the Music of TIM, in: CBRNe WORLD 2/2008, Winchester 2008

Mrs. Eylem KARAASLAN

Eylem KARAASLAN was born in 1978 in Çanakkale. She graduated from Hacettepe University Computer Engineering department in 2001 and started her career in HAVELSAN as a candidate engineer in 2000.

She worked as a Software and System engineer in projects such as Factory Management Information System, Tactical Fire Management System, Air Force Information System Combat Management, Flight Mission Planning System, Document Management System, F-16 Modernization Project (PO-ENT), Image Analysis and Automatic Target Recognition System (HASAT), MBSS (Miniature Bomb Combat System), Coastal Surveillance Radar System (CSRS).

She worked as Ammunition Infrastructures Team Leader, Application Software Team Leader, CBRN Product Team Leader and Technical Manager. She has been working as a CBRN Product Manager since 2019.

Col. (R.) Aytaç KABAKLARLI

(Ret. Colonel) (Respectively) Instructor - Chief - Dean of Academics - School Commander,

Turkish Armed Forces (TAF) Chemical Biological Radiological Nuclear (CBRN) Defence School, İstanbul, May 2006 – May 2011

- Instructor, CBRN Protection and Decontamination Board, Project Officer at various TAF CBRN Defence R&D Projects,
- Instructor, Chemical Defence Board, First implementation of CBRN defence scenarios at brigade level field exercises.
  Hand-held and Stand-off Chemical and Biological Detectors project work group.

- Chief of CBRN Protection and Decontamination Board, Lead member of various project work groups on TAF CBRN Defence R&D Projects,
- Director of the scientific program, lecturer and co-chairman at "International CBRN
  & WMD Seminar-2007" held in Istanbul, 2007
  Instructing CBRN Recce & Decon Advanced Course in Bosnia & Herzegovina, 2009

- Dean of Education & Training Board, TAF CBRN School,
  Starting new TAF CBRN Defence R&D projects,

- Commander, TAF CBRN School,

Architecting and developing various applications for manpower planning and personnel management issues. Cooperation and mutual exchange with all defence industry firms, GOs, NGOs and universities beside military institutions, academies and basic course schools on specific CBRN defence issues.

Vice President of the Board, Acil ve Afet Derneği (ACAT*) (Association of Emergency and Disaster), Ankara, May 2011-May 2018

- Organizing basic and advanced trainings and courses focusing on the institutional and hospital preparedness and management issues before-during-post disaster and emergency.
- Organizing disaster and emergency based panels, seminars, congress, symposiums, domestically and internationally.
- Collaborating with other non-profit associations like "Doctors worldwide" in their trainings of emergency and disaster incident command system.

***ACAT** - Association of Emergency and Disaster (Acil ve Afet Derneği). Currently addressing the emergency medicals and first responders under the topics of CBRN sourced accidents, Toxic Industrial Chemicals (TICs) and Weapons of Mass Destruction (WMDs).

CBRN Specialist& Technical Consultant at FNSS Savunma Sistemleri A.Ş., Ankara May 2012-Dec 2018

- Consulting the project of 8x8 PARS Special Purpose Tactical Wheeled Armored Vehicle (SPV) CBRN Reconnaissance Vehicle production and other CBRN related wheeled and armoured manufacturing and CBRN related system integration projects in FNSS BD & Marketing.
- CBRN Related all technology comparisons and assessments for the detection, identification and analysing devices as well as complementing life support subsystems such as HVAC, collective protection, decontamination, chemical coating, etc.

Solution Engineer & CBRN Specialist at HAVELSAN Hava Elektronik San.T.A.Ş., Ankara Dec 2018-Ongoing

- CBRN related system integration projects for critical infrastructures such as shelters, military installations, transportation lines, customs, airports, seaports, etc.
- CBRN Related all technology comparisons and assessments for the detection, identification and analysing devices as well as complementing life support subsystems such as HVAC, collective protection, decontamination, chemical coating, etc.
- Business development and planning for CBRN detection and identification based R&D activities as well as domestic production for these needs with the private sector and governmental institutions.
- Designating, assessing and consulting the business plans throughout the national needs.
- Business development activities and collaborations with domestic and international companies.

Kuleli Military High School, İstanbul, August 1977- June 1981

- Four-year high school (English preparatory class + science & mathematics program).

Turkish Army Military Academy, Ankara, August 1981-August 1985

- BA in electrics & electronics,
- Four-year hybrid program composed of engineering, management and military sciences,
- First year; basic military sciences, social sciences and applied sciences,
- Following three years; approx. 40% electric &electronics, 30% military sciences & 30% management sciences.

Infantry School, Istanbul, August 1985- July 1986

- Basic infantry platoon leader operational and tactical skills for the officers graduated from military academies.

Cdr. (R.) Marten MEIJER

Marten Meijer (1962) earned a master degree in Organizational Psychology at the University of Groningen in 1986 and a doctorate in Social Sciences at the Erasmus University in Rotterdam in 1998.

From January 2005, commander Marten Meijer served at the NATO Science and Technology Organization in Paris (FRA) as the executive officer of the Human Factors and Medicine Panel.

He was an associate professor at the Faculty of Military Sciences of the Netherlands Defence Academy in Breda, the Netherlands from April 2008. He participated in a field study in ethical decision making in the NATO International Security Assistance Force in Afghanistan in July 2008. He also studied social safety in the Netherlands armed Forces and the effectiveness of asymmetrical operations.

In January 2011 he was assigned to the NATO Command and Control Centre of Excellence as Branch Chief Expertise Management. He provided feedback to NATO commands in Mons, Belgium, Northwood, Great Britain and Naples, Italy, on the implementation of the NATO Comprehensive Approach in NATO Operation Unified Protector in Libya and in NATO Operation Ocean Shield, off the coast of Somalia.

From October 2013 to July 2017 commander Meijer served as a subject matter Expert on NATO Strategic Communication at the NATO Joint Warfare Centre in Stavanger, Norway. He chairs the monthly Joint Warfare Centre Strategic Communication Round Table and is a member of the Joint Warfare Centre Gender Group.

In 2014 he received the NATO scientific achievement award for his contributions to a NATO research group on agility in decision making. From October 2016 to March 2017 he was assigned to the United States Central Command in Tampa, Florida as a strategic communication consultant for the international coalition operation Inherent Resolve, which aims to defeat ISIS terrorists in Iraq and Syria.

In September 2017 he started his last assignment at the Policy Branch of the NATO Joint Force Command Naples in Italy, from which headquarter he deployed to Addis Ababa to support the African Union in maritime policies. He retired as of May 2020.

Off duty, he is a dinghy regatta sailor and competed in the military world championships in sailing in Karlskrona, Sweden, Den Helder, The Netherlands, San Diego, USA, Copenhagen, Denmark and Victoria, Canada. He owns a former Olympic Class Flying Dutchman (H 303) and is a sailing instructor. He married Maria Helena Van Kooten in 1993 and they had a daughter Jantine, 1996, and two sons, Clemens 1995, and Tijmen, 1998.

Capt. (N) Auras-Liviu COMAN

Captain (N) Auras-Liviu COMAN graduated from Navy High School, Constanta in 1987 and Mircea cel Bătrân, Naval Academy, Constanta in 1992.

Upon graduation, he was appointed as Commanding Officer/Fast Torpedo Boat and afterward, in 1993, navigation officer and weapon system engineer on board corvette Barbuneanu. Following those assignments, he served as assistant COS N3, officer in Multinational Operations Planning Department/Fleet HQs and starting with 2006 as the Head of Standardization and Lesson Learned Department/Navy HQs.

He began his military training and education with a Navigation Specialist course, and subsequently, he attended two courses in the Naval Academy, as Weapon Systems Course, and Staff Officers Course.

Between 2001 and 2004 he attended: Allied Joint Operations Staff Officers Course at NATO/PfP Training Centre, Bucharest; NATO Staff Orientation Officers Course at NATO-School, Oberammergau; NATO Military Terminology Instructors Course; NATO/Partner Operational Staff Officers Course - NATO-School Oberammergau; Course for Planners and Executors of Naval Operations on the Law of Armed Conflict, Sanremo, Italy; and NATO Maritime Operation Language Seminar, Naval Academy "Mircea cel Bătran".

In 2010 he graduated with a Master in Military Science and Information at National Defence University "CAROL I" – Bucharest. After graduation he was appointed as CO of corvette ROS MACELLARIU. From 2013 he was promoted as COS in the 50th Corvette Squadron until July, 1st when he was appointed as the Commander of 50th Corvette Squadron.

In 2016 he graduated from Naval Command College, United States Naval war College. He was awarded first prize in the Robert E. Batemans International prize.

Starting with October 2017 he is RON DCOM MARCOM.

Capt. (N) Todd BONNAR

Captain Todd Bonnar, MSC, CD joined the Canadian Armed Forces as a Direct Entry Officer in 1997. After completing Maritime Surface Officer classification training in HMCS VANCOUVER in 1998, he was selected to represent Canada in an exchange with the Royal Australian Navy in HMAS HOBART and HMAS ANZAC during which time he participated in the UN Peace Keeping Mission to East Timor.

He returned to Canada's West Coast fleet in 2000 and subsequently served as the CANFLTPAC Flagship's Above Water Warfare Officer in HMCS ALGONQUIN. During this time, he deployed to the Persian Gulf in support of OP APOLLO, Canada's response to the September 11th attacks earning a Task Force Commander's commendation for his Intelligence work. Captain Bonnar completed his Operations Room Officer course in 2004, returning to HMCS ALGONQUIN where he served as both the Flagship's Weapons Officer and Combat Officer. During this tour he also completed his Area Air Warfare Commanders qualification.

His sea command tour saw him assigned to HMCS PROTECTUER in 2010-2014. During his time in PROTECTEUR, he participated in numerous deployments in support to counter narcotics efforts in Central America with Joint Inter-Agency Task Force (South), earned the Operational Support Medal (Expeditionary) as well as a Commander Canadian Joint Operations Command commendation.

In 2017 he represented Canada as Chief of Staff and Deputy Commander of NATO's high readiness maritime Task Group, Standing NATO Maritime Group One, participating in Operation REASSURANCE in the Baltic Sea and Operation SEA GUARDIAN, NATO's enduring counter-terrorism and security operation in the Mediterranean, earning the Meritorious Service Cross and NATO Secretary General's Meritorious Service Medal for his leadership of the Task Group.

Shore duties saw him employed as J3 Current Operations at Canadian Expeditionary Forces Command in Ottawa, integrally involved with full spectrum joint operations in Afghanistan. In 2014 he assumed command of the Naval Officer's Training Centre charged with developing and mentoring the future cadre the Royal Canadian Navy's commanding officers. In 2015 as part of RCN Transformation, he assumed the inaugural command of Naval Fleet School (Pacific). Upon his return from duties at sea in Europe, he was promoted and assigned the position of Warfare Analysis Branch Head at CJOS in Norfolk, VA.

He holds a Bachelor of Social Sciences Degree from the University of Ottawa and a Masters of Defence Studies with a focus on Chinese Domestic Policy, from the Royal Military College of Canada. He is a graduate of CF Joint Command and Staff Programme 36.

Prof.Guy THOMAS

Guy Thomas served as US Science & Technology Advisor for Maritime Domain Awareness from 2003-2012. He has been involved with surveillance operations in the USN, USAF, USCG, industry, Johns Hopkins University/Applied Physics Lab, (JHU/APL), and operational elements of the Department of Homeland Security (DHS) as an operator, test director, inventor and instigator.

He now is a pro bono advisor to NATO ACT and as the Academic Advisor (Science & Technology) for the Multinational Maritime Security Center of Excellence. He was the Initial author of the US National Strategy for Maritime Security (2005) and wrote Task #1 of the US National Space Policy, "Implement C-SIGMA." He is also the contributing editor for Maritime at Space Watch Global, an online news organization.

Guy created satellite AIS while on loan to the Naval War College from JHU/APL), envisioning C-SIGMA as a natural extension.

A retired naval officer, he spent a year in hostile waters on 3 cruisers and 2 submarines, and has 2,000+ hours in hostile airspace in six different models of reconnaissance aircraft (3 USN, 3 USAF). He was also one of the Navy's initial space cadre.

A Distinguished Graduate of the Naval War College, he also earned a dual MBA/MS Computer System (high honors) and studied Systems Engineering at Johns Hopkins University. Awarded the DHS Distinguished Career Service Award in 2012, and the US Geospatial Intelligence Foundation's Individual Achievement Award (Person of the year) in 2015, he has been nominated for the Space Technology Hall of Fame.

17 September 2020

Panel-III-What must be done to Tackle Maritime Security Challenges during and/or after the Covid-19 Pandemic?

Assoc.Prof. Ahmet KOLTUKSUZ

Ph.D. Dr. Koltuksuz was born in 1961, received his Masters Degree from the Computer Engineering Department of Aegean University with a thesis of "Computer Security Principles" in 1989. Earned his Ph.D. from the same Institution with a dissertation thesis of "Cryptanalytical Measures of Turkey Turkish for Symmetrical Cryptosystems" in 1995, subsequently appointed as an Assistant Professor. He moved to Izmir Institute of Technology, Department of Computer Engineering in 1996 and became a full-time, tenured Associate Professor within the same institution in 1999. Dr. Koltuksuz had established & run the Information Systems Strategy and Security Laboratory (IS3 Lab) in this university. He joined to the department of Computer Engineering of the College of Engineering of Yaşar University in September 2009. He run the chair of the department of Computer Engineering in Yaşar University for five consecutive years. In the same institution, Dr. Koltuksuz initiated the Cyber Security Graduate level program in 2012. He established the Computer Emergency Response Team for Yaşar University (Yaşar-CERT, Yaşar-SOME) in 2014 and has been currently heading it. His research interests are Cryptology, Theory of Numbers, Information Theory, Theory of Computation, Operating Systems, Multicore Architectures, Cyberspace Defense & Security, Cyber Intelligence, Open Sources Intelligence Analysis and of Computer Forensics.

Commodore (HN) Panagiotis PAPANIKOLAOU

Commodore Panagiotis PAPANIKOLAOU was born in Athens in 1965 and joined the Hellenic Naval Academy in 1983. After his graduation in 1987, he served in a broad range of sea assignments, deployments to Mediterranean Sea, and Indian Ocean and he assumed Commanding Officer's duties of HS DOXA (P 63) and HS HYDRA (F 452).

At shore assignments he served as Director of Naval Operations of the Hellenic Frigates and Destroyers Command, Director of Hellenic Fleet's Operational Planning Branch, Director of Chief's in Command of Hellenic Fleet Office, Director Hellenic Fleet's Operations Centre, and Director of Operations Division of Hellenic Navy's Surveillance Command and lately as the Deputy Director of the Joint Operations Centre of HNDGS. Commodore PAPANIKOLAOU also served as the Maritime Operations Branch Head of NATO Maritime Command Naples and as Naval Attaché of Greece in the USA.

He attended a number of military schools and courses among which the Hellenic Navy Staff Officers' Course and Hellenic Armed Forces Supreme Joint War College. He also attended US Navy's Electronic Warfare Officer Course, Air Intercept Controller Course and Surface Warfare Officer Course.

He was promoted to Commodore in March 2019 and assumed NMIOTC's Commandant duties on the 6th of April 2020. Commodore PAPANIKOLAOU has been awarded appropriate national as well as NATO, EU, and USA medals and decorations. He is married to Niki Terzi and they have two daughters.

Capt. (N) Daniel-Cornel TANASESCU

Captain Daniel-Cornel TANASESCU was born on 13th of October 1973. He graduated from the Naval Academy "Mircea cel Batran" in 1997, when he was promoted to Lieutenant, JG. He began his military career as Gunnery Officer on board Frigate "Marasesti" (F111), between 1998 and 2003. He continued as Operations Officer of Frigate "Marasesti", between 2003 and 2008. From 2008 until 2011 he was appointed as the commanding officer of corvette" Eustatiu Sebastian" (FS 264). Upon National Defence University - Master Programmes graduation in 2011, he was appointed as executive officer of Frigate "Marasesti". In May 2016 he was appointed as the Commanding Officer of the Frigate "Marasesti". His post-graduation education includes a Master's degree in security studies from the University of Bucharest (2005), Joint Strategic Leadership Course at the National Defence University "Carol I", Bucharest (2019).

He also graduated from several career courses in Romania or abroad in the field of maritime warfare and staff duties.

Captain Daniel-Cornel TANASESCU received during his career various national awards and titles, among them "Emblem of Honour" from General Staff (2007); "Emblem of Honour" from Naval Forces (2013). He is married and has one son.

Dr. Keiko KONO

Employment:

2019-Present	Law Researcher, the NATO CCDCOE
	Deputy Director, the Strategic Planning Division, Bureau of Defence Policy, Japan Ministry of Defence
2017-2019	Adjunct Lecturer, the National graduate Institute for Policy Studies (GRIPS)
2011-2012	Visiting Fellow, the US Naval War College

2002- Present	Research Fellow, the National Institute for Defence Studies (NIDS), Japan Ministry of Defence
2001-2002	Research Assistant, Jochi (Sofia) University, Japan

In addition, I used to be a Part-time Lecturer at Jochi (Sofia) University, Aoyama Gakuin University, Tokyo Women Christian University, and Chiba University of Commerce.

Grants received:

- Research Fellowships for Young Scientists (DC2), the Japan Society for the Promotion of Science (JSPS),

- Grants-in-Aid for Scientific Research, the Japan Society for the Promotion of Science (JSPS),

- Adachi Mineichiro (Judge of Permanent Court of International Justice of League of Nations) Grant

Education: Master and Doctor of Law Degree at the Faculty of Law, Jochi (Sofia) University

Languages: Working Languages (oral and written): English and Japanese

Nationality: Japanese

Books and Articles published:

- "An Overview of the Report of the UN Panel of Experts established pursuant to the Security Council resolution 1874 (2009): Investigations into North Korean cyberattacks continue", the NATO CCDCOE website, 2020 (in English)

- "Strategic importance of, and dependence on, undersea cables" (co-authored), the NATO CCDCOE website, 2019 (in English)

- "ASEAN Cyber Developments: Centre of Excellence for Singapore, Cybercrime Convention for the Philippines, and an Open-Ended Working Group for Everyone", the NATO CCDCOE website, 2019 (in English)

- "A Japanese Perspective on Deterrence in Cyberspace Gray Zone Contingencies and the Role of the Japan-U.S. Alliance", in The U.S.-Japan Alliance and Deterring Gray Zone Coercion in the Maritime, Cyber, and Space Domains, RAND Corporation, 2017 (in English)

- Japanese edition of the Tallinn Manual 2.0 on the International Law Applicable to Cyber Operations titled International Law on Cyber Attacks: A Commentary on Tallinn manual 2.0 (Shinzansha Publisher, 2018) (co-edited) (in Japanese)

Gözde BOZTEPE KARATAŞ

Gözde BOZTEPE KARATAŞ graduated from TOBB Economy and Technology University Computer Engineering department in 2016. She completed her M.S. degree in computer engineering at Middle East Technical University in 2019. She has been working on data mining and machine learning algorithms since her bachelor's degree. Her M.S. thesis is about vessel route prediction with AIS data. She has also worked in HAVELSAN as a software engineer since 2016.

Sam ZWOLINSKI

Sam ZWOLINSKI gained a master's degree in Physics from St. Anne's College, University of Oxford in 2017. He specialised in Astronomy and Biological Physics, producing a research project on the impact of lunar and solar gravity on tidal amplitudes during the Devonian period, before vertebrate life had migrated to the land.

In 2018 he joined the UK Ministry of Defence, working as tactical analyst in surface warfare at the Royal Navy's Maritime Warfare Centre. His experience lies in modelling, simulation and experimentation of weapons and sensors. Beyond supporting warships on the front line, his professional interests lie in autonomy, novel technologies, and devising innovative ways of communicating complex phenomena through data.

In his spare time he enjoys cinema, architecture and gastronomy.

ABOUT
NATO MARSEC COE

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Maritime Security requires multinational-interagency cooperation and can only be achieved through working together with national, regional and global maritime security organizations as well as civilian agencies. There are numerous national, regional and global maritime security related initiatives around the globe. Among these global maritime security stakeholders are UN, NATO, IMO and EU.

Turkey has a big potential in terms of transportation since she is at the crossroads of Europe, Central Asia and Middle East. The geo-strategic position of the country has been rendered with comprehensive and strategic studies, and Turkey has acquired an identity as an 'Energy Corridor'. 16 years ago, the idea of establishing a MARSEC COE stemmed from the coordination requirement among government, private sector, industry and academies in order to get a more secure maritime environment in our region. In accordance with NATO's smart defence approach, Turkey decided to coordinate and unite the efforts in a centre of excellence acting as a hub for maritime related issues.

With this aim, on 12 November 2012, the Multinational Maritime Security Centre of Excellence (MARSEC COE) was officially inaugurated in Aksaz Naval Base-Marmaris/TURKEY, under the command of Turkish Naval Forces Southern Task Group Command. This institution was established as an outcome from the "Smart Defense" initiative and aimed at Supporting Allies' security interests by working on "Maritime Security" in the surrounding seas.

Due to its proximity to international airports, universities and maritime industry, The Multinational Maritime Security Centre of Excellence was relocated to Beylerbeyi/ISTANBUL in January 2017, and later in March 2018 the centre moved to its present location at the Multinational Joint Warfare Centre building in the National Defence University Campus, Yenilevent/ISTANBUL.

Through the way of becoming a NATO Accredited Centre of Excellence (COE); MARSEC COE, following several coordination visits and meetings and also inputs of NATO Allied Command Transformation (ACT), Allied Maritime Command (MARCOM), Combined Joint Operations from the Sea Centre of Excellence (CJOS COE), and Centre of Excellence for Operations in Confined and Shallow Waters (COE CSW); conducted the First Establishment Conference on 4-7 February 2019, and the Second Establishment Conference on 6-9 May 2019, and have finalized MARSEC COE Concept together with Operational and Functional Memorandum of Understanding MOUs with consensus of the all participants. Greece and Romania declared their intentions as Sponsoring Nations (SN) for the NATO MARSEC COE, and MOU signing ceremony was held with the participation of Turkey as the Framework Nation (FN), Romania and Greece as the Sponsoring Nations (SN), and ACT, on 18 October 2019.

MARSEC COE's 1st Steering Committee (SC) Meeting was conducted at the MARSEC COE HQ/İstanbul on 5-6 February 2020 with the participation of representatives from Turkey, Azerbaijan, Georgia, Greece, Portugal, Qatar, Romania, Spain, and NATO ACT. Later on, Accreditation Assessment Visit was conducted on 04-05 March 2020 by the NATO ACT CPD representatives at İstanbul. As of 8 June 2020, Maritime Security Centre of Excellence (MARSEC COE) achieved the status of "International Military Organization" as the 26th centre of excellence accredited to NATO.

Mission

The mission of the NATO MARSEC COE is to expand the capabilities of NATO and Partner Nations by providing comprehensive innovative and timely expertise in the field of Maritime Security Operations.

Vision

NATO MARSEC COE is to become an internationally recognized focal point as well as comprehensive expertise and knowledge provider in the area of maritime security, thus expanding capabilities of NATO and Partner Nations.

NATO MARSEC COE

Yenilevent, Istanbul / TURKEY

National Defence University Campus

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CONFERENCE PROGRAMME

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OPENING SESSION (16 SEPTEMBER 2020)			
TIME **(LOCAL TIME)**	**EVENT**	**SPEAKER**	**POSITION**
1030-1035	Admin Brief & Group Photo (w/ all speakers)	Cdr. Niyazi Okan ÇOBAN (TUR)	Activity Director
1035-1050	Webinar Welcome Speech	Capt. (N) Sümer KAYSER (TUR)	Director, MARSEC COE
1050-1100	Conference Introductory Comments	Dr. Dirk SIEBELS (DEU)	Senior Analyst, Risk Intelligence
1100-1115	Keynote Speech-I (TBD)	V. Adm. Keith BLOUNT (UK)	Commander, NATO Allied Maritime Command
1115-1130	Keynote Speech-II (TBD)	Brig. Gen. Davide RE (ITA)	Director, NATO Strategic Direction-South (NSD-S) Hub/JFC Naples

SESSION-I (16 SEPTEMBER 2020) OVERVIEW OF MARITIME SECURITY CHALLENGES Moderator (Dr. Dirk SIEBELS)			
TIME **(LOCAL TIME)**	**EVENT**	**SPEAKER**	**POSITION**
1130-1145	Maritime Security and the Anthropocene - Tasks for the Naval Forces of Tomorrow?	Dr. Christian BUEGER (DNK)	Professor of International Relations, University of Copenhagen
1145-1200	The Increasing Role of Maritime Power in Contemporary Geopolitics	Dr. Emre BAYSOY (TUR)	Namık Kemal University, Department of International Affairs
1200-1215	Coffee Break		
1215-1230	Confined and Shallow Waters (CSW) - A Challenging Operational Environment	Cdr. Andreas KUTSCH (DEU)	Centre of Excellence for Operations in Confined and Shallow Waters (COE CSW)
1230-1245	The Impact of Some Geopolitical Aspects on Maritime Strategy from the Bulgarian Perspective	Flotilla Admiral Prof. Dr. Dsc Boyan MEDNIKAROV (BGR) Assoc. Prof. Dr. Siyana LUTZKANOVA (BGR)	Nikola Vaptsarov Naval Academy, Varna/Bulgaria
1245-1300	Examination of the Ship Traffic Regime in North Sea Route According to International Maritime Rules	Assoc. Prof. Sercan EROL (TUR) (Presentation was delivered by Dr. Sait Demir BAKI)	Karadeniz Technical University, Maritime Transportation and Management Engineering
1300-1315	Questions & Answers		
1315-1325	Wrap-up of Session-I (Dr. Dirk SIEBELS)		
1325-1500	Lunch Break		

SESSION-II (16 SEPTEMBER 2020) ONGOING AND/OR POTENTIAL IMPACTS OF THE COVID-19 PANDEMIC ON MARITIME SECURITY CHALLENGES Moderator (Mr. Brian WILSON)			
TIME (LOCAL TIME)	**EVENT**	**SPEAKER**	**POSITION**
1500-1515	The Impact of COVID-19 on Maritime Security, Collaboration, Policy Development and Potential New Challenges	Mr. Brian WILSON (USA)	Deputy Director, Global Maritime Operational Threat Response Coordination Center (GMCC)
1515-1530	Great Power Competition and Grey Zone/Hybrid Activities	Mr. Brian F. Eggleston (USA)	National Maritime Intelligence-Integration Office
1530-1545	Preventing the Proliferation of Weapons of Mass Destruction in the Maritime Domain	Lt. Col. Bernd ALLERT (DEU)	Section Head/Doctrine & Terminology Section/JCBRND COE
1545-1605	CBRN Defence at Sea and Littoral Areas in the Lens of NATO CBRN Warning & Reporting CBRN Approach & Products & Solutions for Maritime Security in a Pandemic Environment at Sea and Littoral Areas	Ms. Eylem KARAASLAN (TUR) Mr. Aytaç KABAKLARLI (TUR)	CBRN Product Manager, HAVELSAN Solution Engineer & CBRN Specialist, HAVELSAN
1605-1620	Coffee Break		
1620-1635	Maritime Strategies of the North Atlantic Treaty Organization and the African Union: Similarities and Recommendations	Dr. Marten MEIJER (NLD)	Ret. NATO personnel

TIME (LOCAL TIME)	EVENT	SPEAKER	POSITION
1635-1650	Improving Readiness and Protection of Crews to Maintain a Reliable Maritime Security Level in a Pandemic Environment	Capt. (N) Liviu Auras COMAN (ROU)	Romanian Naval Forces
1650-1705	Increasing Resilience in NATO ISR	Capt. (N) Todd BONNAR (CAN)	Combined Joint Operations from the Sea Centre of Excellence (CJOS COE)
1705-1720	Questions & Answers		
1720-1735	Wrap-up of Session-II (Mr. Brian WILSON (USA))		
1735-1750	Day-I Wrap-up (Dr. Dirk SIEBELS (DEU) & Capt. (N) Sümer KAYSER)		
1750	End of Day-I		
SESSION-III (17 SEPTEMBER 2020) WHAT MUST BE DONE TO TACKLE MARITIME SECURITY CHALLENGES DURING AND/OR AFTER THE COVID-19 PANDEMIC? Moderator (Assoc. Prof. Dr. Ahmet KOLTUKSUZ)			
TIME (LOCAL TIME)	**EVENT**	**SPEAKER**	**POSITION**
1000-1015	Outlook on Maritime Security Challenges in a Pandemic Environment	Dr. Dirk SIEBELS (DEU)	Senior Analyst, Risk Intelligence
1015-1030	How Maritime Interdiction Copes with Maritime Security Challenges in a Pandemic Environment	Commodore (HN) Panagiotis PAPANIKOLAOU (GRC)	Commander, NATO Maritime Interdiction Operational Training Centre (NMIOTC)
1030-1045	The Maritime Security Strategy - Analysis on Using Autonomous Maritime Systems For Undersea Challenges	Capt. (N) Daniel-Cornel TANASESCU (ROU)	Romanian Naval Forces

TIME (LOCAL TIME)	EVENT	SPEAKER	POSITION
1045-1100	A Case Study of the Dispute in the South China Sea: An Approach by Claimant Countries and ASEAN and Its Impact on Maritime Security In The Region	Dr. Keiko KONO (JPN)	Cooperative Cyber Defence Centre of Excellence (CCD COE)
1100-1115	Coffee Break		
1115-1130	Advanced Analysis and Fusion for Improved Risk Analysis at Sea	Ms. Gözde BOZTEPE KARATAŞ (TUR)	Software Engineer, HAVELSAN
1130-1145	How Can Navies Serve Their Countries at the Start of a Transformative Decade?	Mr. Sam ZWOLINSKI (UK)	Surface Warfare Analysts, Maritime Warfare Centre/UK
1145-1200	Questions & Answers		
1200-1215	Wrap-up of Session-III (Assoc. Prof. Ahmet KOLTUKSUZ) (TUR)		
1215-1245	Wrap-up of the Conference & Closing Remarks	Dr. Dirk SIEBELS (DEU) & Capt. (N) Sümer KAYSER (TUR)	
1245	End of the Conference		

CONFERENCE ORGANIZATION COMMITTEE

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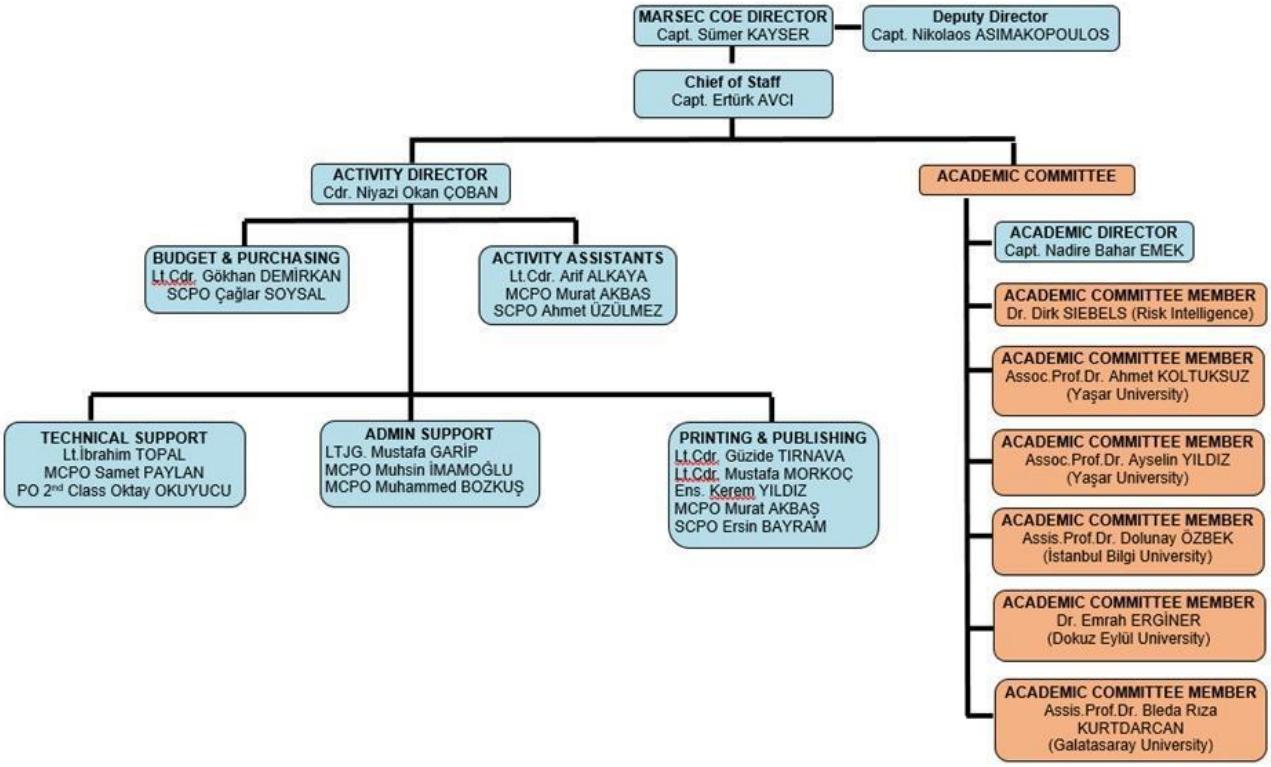

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