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# nmiotc

## *Maritime Interdiction Operations Journal*

NATO MARITIME INTERDICTION  
OPERATIONAL TRAINING CENTRE

12th NMIOTC Annual Conference welcome address by Vice Admiral Ioannis Drymoussis  
GRC N Deputy Chief of HNDGS

Ireland and EU Common Security & Defence Policy: Operation Sophia as an Example of EU Contribution in the Maritime Environment

Restructuring regional stakeholder's response to secure Western Indian Ocean Region (IOR)

Augmenting Maritime Command and Control over a Regional Common Information Sharing Environment Implementation: Montenegro Case

12th NMIOTC Annual Conference Speakers' Inputs

Gender Perspectives in Maritime Security Seminar Report





# NATO Maritime Interdiction Operational Training Centre

**5<sup>th</sup> NMIOTC CONFERENCE ON CYBER SECURITY IN MARITIME DOMAIN**

**29<sup>th</sup> – 30<sup>th</sup> September 2021**  
**Souda Bay, Crete**

The banner features a central collage of puzzle pieces representing various maritime and cyber security themes, including a padlock, a globe, a ship, a scale of justice, an airplane, a city skyline, and a person at a computer. The background is a blue circuit board pattern.

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## NMIOTC Commandant's Editorial

NMIOTC stands as the only NATO Quality Assured Educational & Training Facility, dedicated in training and research in the maritime domain. Our core aim and endeavors correspond to the needs of the Alliance to enhance both capabilities and awareness in maritime security, as well as to build bridges and establish common understanding among allied and partner nations, as well as the academia and the private sector, in all matters within the broad maritime security spectrum. With regards to the unprecedented pandemic crisis, and thanks to the Greek de-escalation plan and the preventive / protective measures that

were implemented, the Center stands now full ready to reiterate its courses, seminars and conferences with the safety of personnel and trainees always remaining its first and foremost priority.

This year NMIOTC organized its 12th NMIOTC Annual Conference. The Conference theme was "Opportunities and threats from Innovative and Disruptive technologies: Shaping the future of Security in the Maritime Domain".

The Emerging and Disruptive Technologies (EDTs), such as Artificial Intelli-

gence, Big Data, Quantum technology, Robotics and Autonomous Systems - to name but a few -, have already affected many aspects of human life and are certainly appraised to have a disruptive impact mostly in the deterrence and defence arena, revolutionizing the future military capabilities, the strategy and the operations. Long discussions have been respectively carried out, while intense investments are being made all across the globe towards the development of these innovative technologies and their possible defence applicability.

Why emerging? because they are

expected to reach full maturity in the years to come.

Why disruptive? because they attempt to displace established technologies and procedures from the market and because their application drastically changes the rules and habits of functioning within societies, organizations or industries. The invention of the mobile phone strikes out as the most prominent example of such developments!

Therefore, EDTs are said to have the potential to change “the rules of the game”, without any guarantee of success though. They may provide new and more effective military capabilities on the one hand, but on the other hand they may render existing defence systems inefficient or even obsolete. At the same time the inherent uncertainty characterizing the maturation of emerging technologies, creates ambiguities and risks with regards to their potential exploitation by adversaries, posing a serious threat to the Alliance security.

Recognizing the importance and the complexity of this issue and being aligned with the Alliance’s approach to innovative technologies, the Center chose to dedicate its annual conference to these developments, focusing by definition in the maritime defence and defence spectrum. We are

convinced that a whole-of-government and a whole-of-society approach are paramount to access the necessary means and authorities to address such challenges. Through this high-visibility conference, we anticipated to facilitate common cognition and approaches and to promote synergies among the international community of interest, conditions that we consider necessary in order to effectively prepare ourselves to defend against advanced or unprecedented threats and avoid catastrophic impacts to our nations, industries and societies.

We have realized that peace and prosperity in the world is more than ever before dependant on the common understanding and honest collaboration among all stakeholders. They should now enhance their synergy and advance their level of cooperation to fully respond to modern needs. NMIOTC counting more than 10 years of successful function stands ready in support to NATO effort to embrace innovation, interoperability and disruptive approach to current and emerging technologies in order to act as one of the key role players in capacity building and stability projection in our troubled world.

Right after the 12th NMIOTC Annual Conference, the Center organized its “Gender Perspectives in Maritime Security” Seminar. The integration of gen-

der perspective in maritime security is still very much uncharted waters, yet gender is indeed relevant in the maritime domain. Assessing the different threats that men, women, boys and girls face when crossing sea borders, it is crucial in dealing with maritime security challenges. The lack of gender perspective may result in failing to identify those in vulnerable situations who are in need of protection. Therefore, gender analysis does not apply only on land but also at sea. Essentially, acknowledging the gendered dimensions of vulnerabilities at sea, offers a more inclusive and “human centered” approach of the contemporary maritime security challenges that may ultimately enhance operational effectiveness.

NMIOTC endorses the integration of gender perspective in all its training products and activities. Consistent with the NATO Education & Training plan for gender in military operations, the Center provides tailored gender awareness training to boarding teams and naval units during pre-deployment training. We strongly believe that the greatest effect is gained if gender perspective is included in the earliest forms of education and training, and mainstreamed through courses at different levels to achieve lifelong and transformative learning.

**Charalampos Thymis**  
Commodore GRC (N)  
Commandant NMIOTC



**12<sup>th</sup> NMIOTC Annual Conference**  
**Welcome address of the**  
**Deputy Chief of the Hellenic National Defence General Staff**  
**Vice Admiral Ioannis Drymousis GRC N**

Distinguished guests, esteemed colleagues, ladies and gentlemen.

First and foremost, I would like to thank our hosts for their warm hospitality and the outstanding organization of this high visibility Conference.

On behalf of the Framework Nation, Greece, I extend my greetings to all of you, who are attending virtually this event and I cordially welcome the rest of you, who have the chance to be in person here, at NATO Maritime Interdiction Operational Training Center (NMIOTC) premises, in Souda Bay Crete.

To begin with, I would like to congratulate NMIOTC, for standing up very well to the occasion of the current pandemic. The Center, since its activation, has made an outstanding progress and placed itself proudly within NATO Education and Training community. NMIOTC made its best to maintain its activity, despite the pandemic restrictions, and now, it further boosts its courses, seminars and conferences, with the safety of personnel and trainees always remaining its first and primary priority.

Dear attendees, today, we are all witnesses to the unprecedented changes evolving around us, due to the occurrence of major technological achievements. Unmanned Air Vehicles (UAVs), smart phones, satellites, internet, five G (5G) networks and numerous other innovations have changed drastically and keep changing our lives, our societies and our world.

Today's Conference, bringing together virtually individuals across the globe, into a single room, is a great example of the changes that take place. Organizations such as NATO and EU shall not and cannot stay unaffected of this transformation which is being carried out.

The level of technology has always dictated the warfighting capability of nations and played its own important role in shaping their strategies. World War II can tell us a lot. The access to vital intelligence, thanks to the British who developed decoding communication systems is just one typical case, which reveal the magnitude of the impact that technology can have on warfare and grand strategy.

Similarly, nowadays, Emerging and Disruptive Technologies are fundamentally challenging the manner in which deterrence, defence and, more generally, security strategies are formulated and enforced at national and multilateral levels.

Any change in technology leads to modifications in the operational and combat plans. We must recognize that technology is developing much faster than doctrine, and a lot of effort is required in order to close this gap, as much as possible, with proper prioritization.

Hence, for any state, for any military organization, it is extremely important to monitor closely the progress made in technology realm, which has direct or indirect defence utility.

States would also be required to be aware of the military-specific technology interests of their adversaries. Investments made towards the development of new technologies and their possible defence applicability need to be monitored.

Today, once again, the military and defence sectors face their own challenges and dilemmas with Emerging and Disruptive Technologies.

However, dear attendees, I am afraid that being just an observer of the technological train passing by, is not enough. It is vital also to adapt, to innovate and to seize the opportunities technology offers, to find solutions to our most pressing challenges. It is crucial to rethink the way we work and operate. We shall be agile, but simultaneously cautious.

In the context of our Alliance and in the spirit of the agreed NATO Military Strategy and the NATO Warfighting Capstone Concept, it is foreseen that the Alliance will pursue to acquire and use new technologies. They will be the means which will be exploited by the Alliance in order to develop and maintain its strategic and operational advantage against its threats and strategic competitors

Development of Emerging and Disruptive Technologies is based on innovation which in turn is developed by the academia and industry. The rapid rhythm of their development and their expected use by competitors, have made it imperative for the Alliance and its member states to timely adapt.

Undoubtedly, the ongoing developments on Emerging and Disruptive Technologies, will inform other evolving NATO processes such as Deterrence and Defence Posture, NATO defence Planning Process, Arms Control, Disarmament and Non Proliferation and Export Controls as well as experimentation, training, exercises, and finally, Strategic Communications.

In this regard, Greece highly supports Supreme Allied Commander Transformation priority to declare "innovation" as a priority for his Warfare Development Agenda.

As I said, we all have to work systematically to take advantage of the advance technology's opportunity.

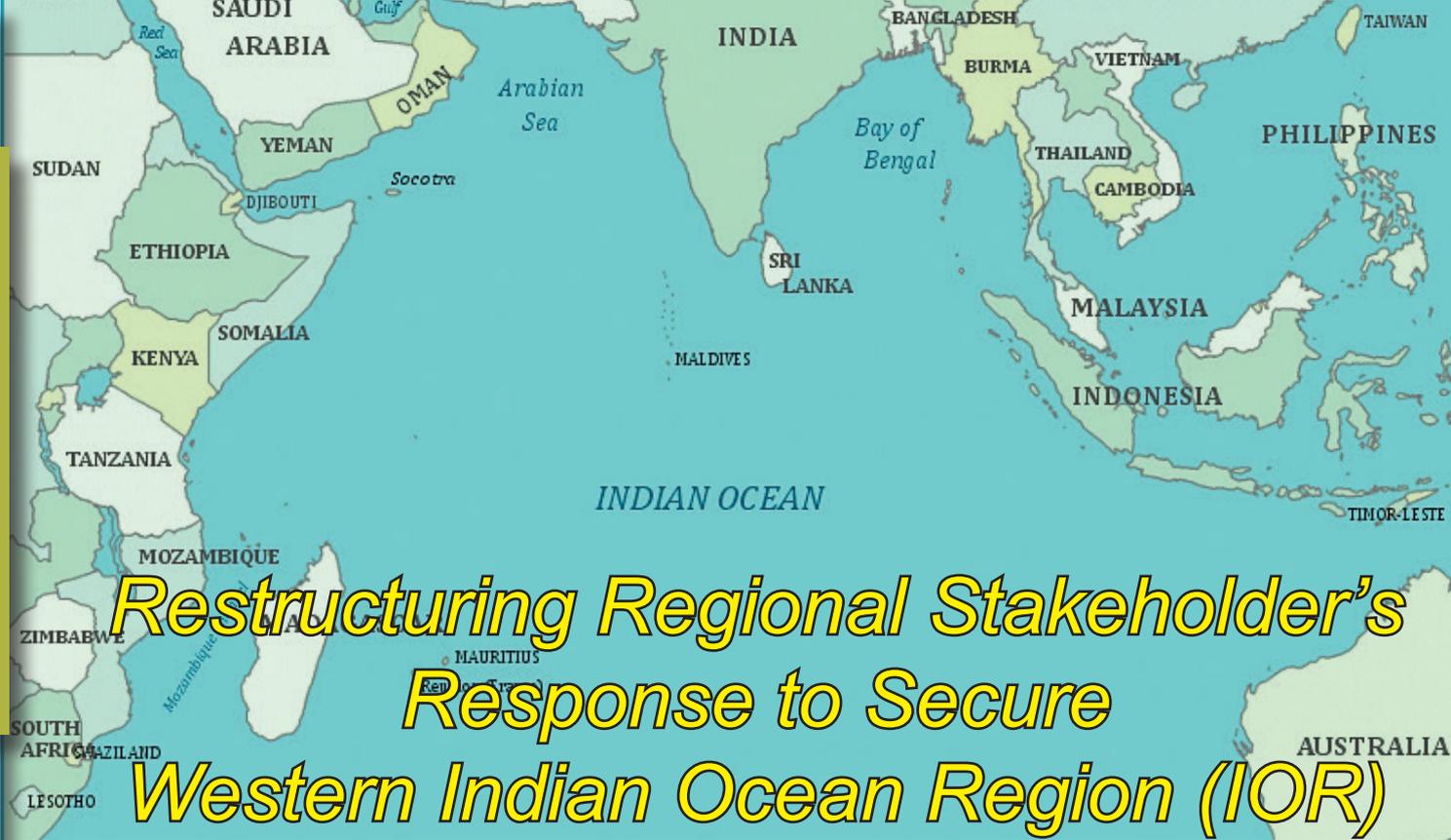
Finally, in close cooperation with the academia and corporate world, we need to develop an overarching strategy, which will frame Alliance's attitude against Emerging and Disruptive Technologies, in order to harness their potential for our best benefit.

Distinguished guests, Ladies and Gentlemen,

The theme of the current Conference sums up in a few words all the arguments around Emerging and Disruptive Technologies. The advent of Emerging and Disruptive Technologies opens the window for huge opportunities, whereas their misuse or their fall into the wrong hands poses a serious threat. Yes indeed, as the theme implies, EDT have the potential to shape the future of Security in the Maritime Domain. That is why I believe, that this Conference offers a great opportunity to further promote and broaden the discussion about EDT's prospects.

Thank you for your attention. I wish you a constructive Conference with fruitful discussions.

For those ones who are lucky enough to be here in person, I wish you a joyful stay in Crete!



# *Restructuring Regional Stakeholder's Response to Secure Western Indian Ocean Region (IOR)*

by Anant Mishra

Web Manager-cum-Researcher at the Centre for Land Warfare Studies (CLAWS)

## **Abstract**

The regional security situation in the western Indian Ocean Region (IOR) remains volatile due to piracy, trafficking and smuggling, despite the presence of multinational naval task force. It is because of the failure on the part of nations that have a substantial stake in the region have shied away from developing a sub-regional security framework to strengthen cooperation and coordination among various stakeholders. While numerous talks and discussions have happened to chart out the future course of action, nothing concrete has happened so far. Due to which most of the cooperation that happens remains an individual initiative than a collective endeavour. The region not only have the presence of top three failed states but also terrorist organizations like Al-Qaeda are active having metamorphosed their operational capability from land to the maritime domain, which earlier was exclusive to piracy. Hence, it is

imperative to have a sub-regional security framework to ensure the commitment of both human and technical resources to ensure the stability of the region.

## **Introduction**

Today, the Indian Ocean Region particularly the Western bound is at a crucial intersection. Threats to maritime security is exponentially increasing<sup>i</sup>. The entire Western bound has become a hotbed for drug trafficking<sup>ii</sup>. Migrant Smuggling, Human & organ trafficking, weapons (small & light arms) trafficking, illicit wildlife crimes and poaching of aquatic species have become rampant<sup>iii</sup>. The threats emanating from Somali pirates, who were responsible for hijacking more than 170 small and large merchant ships<sup>iv</sup>, have been momentarily suppressed. Nonetheless, the organisational architecture of pirates remains functional and mobile due to which the threat remains eminent<sup>v</sup>.

Furthermore, nations lying within the Western Indian Ocean are fragile. According to a recent in-house publication of a prominent maritime security centric think tank, the levels of instability in the region is higher since the states (according to indexes used by the think tank) lay between 75 to 85 in its instability measuring index<sup>vi</sup>. Importantly, The Western Indian Ocean region hosts three of the top ten most fragile states, particularly Yemen, Somalia & Pakistan.

Radical Islamic militant groups such as Islamic State, Al Qaeda and its affiliate groups such as Boko Haram and Al Shabab are carrying out their Jihad in these countries. Carrying out coordinated attacks at the sea, is a recent addition particularly taking place after the attack on the MV Limburg in 2002<sup>vii</sup>.

Undoubtedly, the region to the West of Indian Ocean is of global critical maritime importance. It hosts vital

international trade and important movement of resources travelling through Persian Gulf, Europe and Asia. Yearly, almost 42,000 shipping vessels travel through this route<sup>viii</sup>. In an effort to counter piracy off the coast of Somalia, the region continues to witness heightened maritime patrolling since 2008. A total of three international maritime joint operations are currently functional in the region. This includes EU's maritime Operation Atlanta, NATO's Operation Ocean Shield and US-supported Combined Maritime Forces reinforced by navies from India, Russia, China & Japan<sup>ix</sup>. Irrespective of any particular time or day, all the three operations are functional with a significant response team of more than 30 rotary wing aircrafts supported by numerous attack boats. Ironically, 150 vessels were boarded alone in 2015 out of which 12 vessels were fired upon, seven were hijacked, and roughly 22 attacks were thwarted. Such aggressive tactics employed by pirates even after significance naval presence have forced maritime security and international counter-terrorism experts to formulate a dedicated strategy to effectively counter piracy in the Western Indian Ocean region. As NATO decided not to renew its operation post 2016, three years later, the fate of EU's counter-piracy operations too hang in the balance. In the light of an abrupt closure of such vital international maritime security operations and with no new joint maritime security mission in sight, it is important for decision makers and military leadership to formulate a dedicated policy to effectively counter vast maritime security challenges while keeping in mind the region's potency to counter such adverse threats once the naval operations are complete.

In the light of significant increase in piracy and vessel-boarding incidents the discontinuation of international counter-piracy operations and time taken by military leadership to renew or initiate new operations remains

an issue. Policy makers and military leadership need to deliberate on decreasing inter-naval rivalries and potential disagreements between them and formulate mechanisms on strengthening coordination in case an international joint maritime security operation concludes in their region, while identifying other international legal mechanisms which can temporary be activated to replace United Nations Security Council Resolutions while giving the latter adequate time to formulate a new counter-piracy legislation.

Since 2016, there have no concrete international maritime security and counter-piracy centric legislation nor any effective joint international counter-piracy operations in the region. In the meantime, the maritime security issues persist rather increasing exponentially, with major militant actors evolving their piracy tactics. Stakeholders must participate on strengthening international security architecture by reinforcing it with critical multilateral partnerships in an effort to make the region secure even if international maritime task forces cease operations.

To formulate a concrete region-specific maritime strategy, the author spoke to numerous maritime security experts in an effort to formulate a skeletal plan for a future maritime security centric structure. The author was appalled to note no less than sixteen policies, agreements, intra-navy operating dossiers, fluid SOPs during discussions particularly to formulate an initial structure on joint maritime operations in the region<sup>x</sup>. These policies were strictly focussed on strengthening regional navies coordination & cooperation in countering illicit trafficking of aquatic animals/fishes, human & drug trafficking, migrant smugglings, weapons trafficking, and opening doors for maritime security stakeholders, military leadership, private partners and members of the academia to deliberate on fixed

intervals.

Interestingly, every regional partner/ stakeholder has formulated a policy to counter challenges. Although, there applications/operational perspectives to counter such challenges are aggressive and on paper seems successful, none of the stakeholders mention about tackling such challenges jointly in the region, nor have they developed mechanisms to do so.

The objective to formulate a dedicated security architecture in the region is undoubtedly complex as it is not only intertwined with stakeholder's politico-economic agendas, but regional rivalry further eliminates the joint security element out of the policy. Furthermore, there are no established inter-agency operational guidelines and varied interests between states further hamper any hope for a future intra-agency interaction. The complexity is further plagued by overwhelming SOPs to multiple institutions. These SOPs are more or less the same for every tasked agency in an effort to get the job done.

Moreover, resource deficient states are forced to relocate available resources to security centric institutions which are operationally inefficient due to vivid objectives, inadequate personnel and binding operational restrictions. Such institutions, let say hypothetically, will not be able to deliver desired results or participate with regional partners effectively and efficiently. This hurriedness to receive desired results with limited literally functionless institutions needs to stop. Policy makers and military leadership must maintain a clear sight and a dedicated viable strategy on the region's ability to secure its international waters independently, without completely relying on international partnership, making it self-sufficient. This process, however, will remain a good paper-policy without regional state's partnership.

International assistance from multi-naval partners, is undoubtedly a boost to strengthen regional security architecture, but their repetitive interference in policy planning and abrupt decisions to end an ongoing naval operation or not to renew one, effectively weakens regional maritime security structure; in such a scenario, it is best for international partners to ratify agreements formulated by regional actors limiting and defining their roles and responsibility including operational tenures. However, to draft this, numerous factors needs to be considered.

### **Maritime security through a holistic prism**

Stakeholders within the IOR have varying operational priorities and strategic objectives which are fulfilled through different naval tactics<sup>xi</sup>. Interestingly, South Africa & India are the only two blue water naval powers operating in the region. They do not only possess strategic and economic superiority, but joined by Kenyan, Iranian and Pakistani navies, they also maintain the balance of power. Their strategic and economic leadership is critical to secure peace and security in the region. For smaller island regional economic states, such as Maldives and Seychelles, their interests lay predominantly in securing strategic maritime objectives. Regional island nations are suitable in brokering maritime agreements as their leadership have the potential to provide new valuable thought-provoking insights on regional security matters to intellectual global leaders and military commanders, which otherwise fails to make it on the agenda. Initiating a new campaign to strengthen its maritime dependent economy, Seychelles have already taken the lead<sup>xii</sup>.

Conflict rigged nations, particularly Yemen and Somalia, are at the epicentre of rising maritime insecurity in the region. They not only need

adequate and dedicated resources to overcome domestic challenges, rather it will be immense difficult even for power nations to cater resources in an effort to eliminate emanating maritime threats, especially due to rampant fire engagement between government and rebel forces on the ground.

The Western-IOR has a long historical relationship with maritime pre and post-colonial trade. For more than a century, the Arabs, the Asians and the then European empires flourished because of their economic relationship with the kingdoms laying within the Western-IOR<sup>xiii</sup>. Cultural-economic relationships such as these have resulted in the emergence of a multi-cultural, multi-racial, multi-ethnic societies within intellectual boundaries, which have been dominating global socio-economic societal structure even today. The traditional regional belongingness, although, weakened, continue to remain fragile, as evident from poor inter-ethnic cooperation in major economies in South East Asia and Africa. This deteriorating regional fragility is further complexed with boundary disputes and inter-state rivalries. Nonetheless, if it persists similar to Indo-Pak rivalry or that of Somalia or Kenya or remains heightened due to frequent claims on small islands as between Mauritius, Madagascar and the UK, efforts to implement cooperation & coordination or confidence building mechanisms in the region will look seemingly impressive on paper. Innovative regional cooperation mechanisms that too out of sheer ego and economic expansionist greed reinforced by recognition to its pre-colonial trade relationships and establishing mechanisms to jointly work towards ensuring maritime peace and security, could revive productivity in the region.

### **Effects of maritime insecurity on regional economies**

Masses living in and around the coastal region depend majorly on

fishes for their primary income and nutritional basics. Crimes against aquatic animals and fishes adversely damages their local environment and increases food insecurity in the region. According to one estimate of the Food and Agriculture Organization (FAO), the lifestyle of roughly 3 million Tanzanians are intrinsically linked to fisheries centric occupation, such as its sales and processing centres, besides building trawlers, boats and other fishing vessels<sup>xiv</sup>. Experts continue to argue on the antecedent relationship between piracy and illegal fishing, however, the sudden peak in piracy off the coast of Somalia particularly after 2008 highlights the seriousness of this issue: fishing opportunities in international waters and under the jurisdiction of other states created a formidable pretext for local fishermen to attack ships under the justification cloaked with the motive of defending their right to food and protest against foreign exploitation<sup>xv</sup>. Amid regional insecurity and political instability, policy makers failed to address the needs of local masses which attracted the attention of local religious jihadi militant groups resulting in an unprecedented saga of crime fuelled with radicalisation which continues to exponentially proliferate as of today. With international naval actors and external stakeholders functioning under the come and go policy in the Western IOR, it will be foolish to leave regional maritime security on their behest. What needs is a sustainable policy that is effective in combatting all maritime challenges while strengthening regional naval capacities to jointly combat any issue that threatens the integrity of the Western IOR. The states located at the hinterland, or in and around it, do not have the luxury to establish a multidomain state of the art navy to maintain constant maritime vigil. The states laying within the hinterland have an average Exclusive Economic Zone of about 667,104 km<sup>2</sup>, with a total round of to an estimated 11 million km<sup>2</sup><sup>xvi</sup>. Interestingly, many nations

such as Maldives, Comoros and the Seychelles have territorial lands smaller than their Exclusive Economic Zones. Regional nations such as India, South Africa and Iran have well developed and experienced navies but continue to face numerous challenges particularly in combatting illicit fishing, trafficking or intercepting foreign vessels crossing their EEZs illegally. With a responsibility to protect an EEZ of roughly 1.3 million km<sup>2</sup>, Seychelles, having the second largest EEZ, second only to India in the Western IOR region, possess a meagre naval strength of only two hundred officers and nine-armed patrol vessels to vigil the area<sup>xvii</sup>.

Fragility in the Western IOR region will continue to increase if maritime security remains delicate and shaky. Nonetheless, reinforcing additional military support is not the only solution. Although navies do play a critical role in strengthening maritime security mechanisms, law enforcement institutions, intelligence agencies and coast guards have equal vitality. Sharing actionable intelligence and coordinating & cooperating during operations within international legal mechanisms play a crucial role in reviving stability and security in the region and cost effectively does the job well without inviting state of the art heavy naval firepower. Undoubtedly, maritime security is a transnational issue. Coordinating and cooperating with regional stakeholders, jointly gathering and sharing resources and conducting joint operations are some of the significant steps which could get the job done. However, the aforementioned steps are only possible with forward thinking institutional leadership and right assets in the dockyard.

The challenges faced by Western IOR is not only limited to fragile navies and inadequate law enforcement institutions. One major issue is global nation's rampant decisions to militarize the region. Closing a joint

counter-piracy mission or a dedicated international counter-piracy operation does not necessarily point to a complete withdraw of all naval forces from the region. Rather, it points to the fact that the international naval actors have not limited their agenda to combat piracy but have a larger strategic objective to achieve in the region<sup>xviii</sup>. This is evident from Beijing's ambition, which continues to expand its naval operational outreach and potentialities in the region<sup>xix</sup>. Anti-piracy operations not only opened opportunities for Beijing, but for numerous naval powers, such as Australia, Japan and Korea, to exercise rapid long term-maritime deployments. Both China and Japan have set up their first functional overseas naval base in Djibouti<sup>xx</sup>. With Indian Ocean in its own backyard, New Delhi too is reinforcing its strategic military and naval partnership with regional allies. France and the UK, once pre-colonial enemies and naval arch-rivals too have numerous strategic naval bases in the region. The US Navy continues to conduct numerous joint-piracy operations in the region along with its allies. With a full functional naval support facility in Diego Garcia, the US has access to its naval bases in Djibouti and Bahrain. Displaying vivid manoeuvres through aggressive deployment of naval power in the IOR, the US is determined to keep a significant naval presence in the region within the background of maintaining peace and security while operating in disputed waters.

### **A trans-national challenge**

Even if international and external actors do cease their joint counter-piracy operations, their naval forces might reposition themselves in a strategic holding pattern to maintain presence in the region indefinitely. The rampant deployment of strategic forces in the Western IOR further threatens peace and stability in the region. Although expecting any consequence or a reaction at the South China Sea is highly improbable.

Furthermore, if the region becomes a host to geo-politico-strategic tussle, petite tensions and regional stress could potentially burst into a major dispute. This is evident from the tensions arising between India, China and the US. While looking at these unintended rivalries, in the light of continued militarisation, cooperation between regional allies will be highly unlikely which could further diminish any hope for a dedicated structured international mechanism to strengthen maritime security in the region.

### **Formulating a dedicated international strategic group in the Western-IOR**

Interestingly, the UN committee and the IORA are the only two international institutions which overwatch maritime security mechanisms in the region. They need to be strengthened in an effort to increase their productivity to cater to the challenges of today. Furthermore, to formulate viable maritime security mechanisms, these aforementioned institutions must function with cent per cent effectiveness and efficiency. These aforementioned institutions possess the desired/necessary architecture and operational framework, if harnessed carefully, could play the role appropriately. To initiate dialogue/deliberation at the top echelons, the UN committee is the appropriate place since it has direct access to the members of the United Nations Security Council and the General Assembly, and it could provide access to real time strategic details on international naval movements in the region. Regionally, IORA is the only group with the potential to implement viable strategic mechanisms in the region and synchronise it with tactical manoeuvres. The issue, here, is that they are thinly resourced to cover the entire IOR with diverse operational objectives/expectations and planning. To eliminate the confusion, decision makers could either align these two

organizational architectures or design new sub-institutions within them to dedicatedly cater to the needs of the Western IOR.

Importantly, the institution will be tasked with supreme authority to plan and execute combined maritime security operations – tactical joint law enforcement operation, intelligence dissemination, deployment of joint training and resource mobilisation mechanisms along with maritime surveillance and joint crisis response. Today, most of aforementioned tasks are carried by international stakeholders.

However, there are numerous regional institutions that possess aforementioned capability<sup>xii</sup>. This involves joint operations functioning under the counter-piracy agreement such as the Djibouti Code of Conduct (DCoC), operating under the European Union initiatives to strengthen regional maritime security measures in the MASE region (Eastern and Southern Africa-IOR, or the United Nations Drugs and Crime initiative such as the Indian Ocean Forum on Maritime Crime (IOFMC). The aforementioned programs are strictly voluntary and operates only on the stakeholder's interest. Furthermore, programs such as the DCoC and MASE are geographically limited. Their area of operation is strictly limited to Eastern African and Arabian Peninsula.

Taking the geographical expansion of the Indian Ocean Region into account, it is safe to say that more such operations the better. Although, considering regional territorial tussle between emerging and expansionist economies, overt deployment could backfire. Instead, deploying selective mechanisms in the region and

later, if need be, expanding it (by increasing stakeholders), could get the desired results. Subsequently, certain mechanisms could be further strengthened by reinforcing them with selective objectives from MASE or DCoC. However, the implementation of such mechanisms would rest majorly on cooperation from regional stakeholders, since interests of the emerging nations vary and so does financial contributions. Alternatively, decision makers in consultation with military leadership could formulate a dedicated institution to cater needs of the Western-IOR. This is a highly probable recommendation, as it would further add to the list of institutions operating in the region.

Furthermore, a strengthened maritime security mechanism has its roots from discussions/informal policy deliberations between military leadership, strategic experts, law enforcement & intelligence institutional heads and members of the academia. This calls for decision makers to initiate multilateral strategic regional discussions/dialogues at all levels. Dialogues such as these will function as confidence building mechanism which will then boost trust and establish inter-disciplinary interaction within stakeholders. Moreover, using such informal groupings/dialogue sessions, decision makers and military leadership could deliberate on challenges and work towards formulating a dedicated maritime security mechanism for the region.

### **A safer, secure Western IOR**

It is in the interest of every stakeholder to create a safer and secure Western Indian Ocean Region. States in the hinterland along with their international and external stakeholders, will have

to seriously deliberate on formulating a dedicated operational maritime security mechanism. Pirates off the coast of Somalia have increased their frequency to intercept ships, which has exponentially increased the seriousness of maritime insecurity in the region. Besides piracy, smuggling of aquatic species have also increased, and the rampant build-up of naval dockyards by regional expansionist economies have further complicated the issue. As international joint-piracy missions come and go, maritime security should be the only priority for regional economies.

This brings regional economies, particularly those in and around the IOR, at an important intersection. The international trade (particularly that of blue economies on which sustenance of local people depend) would flourish only with a secure IOR. In 2019, policy makers must formulate a new viable maritime security mechanism dedicated to catering Western-IOR needs. The foundations were already laid in the institutions established after 2008. Although, it's organizational architecture and operational functionalities are largely complex and a meagre reflection of global powers strategic objectives. The baton should be given to regional economies with an objective to initiate a vision for a safer, secure IOR domain which is echoed in a dedicated regional centric maritime security policy through its effective and efficient operational mechanisms. A safer, secure Western IOR even in the light of regional tussle is possible even today. The future of the region lies in the decision of policy makers, their ability to deliberate with regional and external stakeholders, and their sheer will to succeed.

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# *Ireland and EU Common Security & Defence Policy: Operation Sophia as an Example of EU Contribution in the Maritime Environment*

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by Lt Cdr Tony O'Regan &  
Dinos Kerigan-Kyrou

This paper will discuss the background to the EU Naval operation EUNAVFOR MED. It will focus on Ireland's role providing a key maritime resource in a multinational environment working with partners across the EU and NATO. It will explain some of the unique aspects of the mission from the first-hand perspective of an Irish Defence Forces Naval Service officer centrally involved with the EU operation. Finally, it will draw some conclusions about how all EU states can contribute to a dynamic maritime operation such as EUNAVFOR MED.<sup>1</sup>



For five years from April 2015 EUNAVFOR MED - also known as Operation Sophia - was a central part of an EU comprehensive response

addressing the root causes of human trafficking and people smuggling in the South Central Mediterranean. Causes of this situation include conflict, poverty, climate change, and persecution.<sup>2</sup> The mission's core mandate was to identify, capture and dispose of vessels and other assets used by smugglers and people traffickers.<sup>3</sup> The aim was to contribute to wider EU efforts to disrupt human smuggling and trafficking networks in the region, to prevent loss of life at sea, prevent terrorism, and to disrupt organised criminal networks involved in illicit activities.<sup>4</sup>

<sup>1</sup> The authors are particularly grateful to Irish Defence Forces Lt Cdr Elaine Moloney for her role in enabling this paper.

<sup>2</sup> For further information about EU civilian and military operations see: European Union External Action Service (EEAS) at: [www.eeas.europa.eu/topics/military-and-civilian-missions-and-operations/430/military-and-civilian-missions-and-operations\\_en](http://www.eeas.europa.eu/topics/military-and-civilian-missions-and-operations/430/military-and-civilian-missions-and-operations_en)

<sup>3</sup> See: EEAS: EU NAVFOR MED at: [www.operationsophia.eu](http://www.operationsophia.eu)

<sup>4</sup> For a broad analysis see: Anne Ingemann Johansen, "Assessing the European Union's strategic capacity: the case of EUNAVFOR MED Operation Sophia," *Journal of European Security* 26, no. 4 (2017).

## Background

The danger to Europe and the wider region of the criminal activity exploiting human misery is very clear. According to Irish Defence Forces<sup>5</sup> Cmdr Caoimhin MacUnfraidh, Joint Operations Centre Director Op Sophia, Operational Headquarters, Rome:

"The brutal, human smuggling engaged in by criminals on a well-documented scale raises the possibility that certain actors may, directly or by proxy, gain control of that trade and of the oil trade in Libya, allowing the exertion of terrible pressure on the EU. This combination of human rights, economic risk, and geopolitical manoeuvring on the EU's southern border has produced a febrile and dangerous situation."<sup>6</sup>

In 2016 Op Sophia's mandate was reinforced with the addition of two supporting tasks:

- Training the Libyan Coast Guard (LCG) and Libyan Navy;
- Contributing to the implementation of the UN arms embargo on the high seas off the coast of Libya.

Information on human trafficking

was shared and coordinated with EU Member States' law enforcement agencies, together with FRONTEX<sup>7</sup> (the EU's border and coastguard agency) and Europol<sup>8</sup> (the EU's policing agency).

Op Sophia was designed around four specific phases:

- 1) Forces deployment to build a comprehensive understanding of smuggling activity and methods.
- 2) Maritime interdiction: the boarding, search, seizure and diversion of smugglers' vessels on the high seas, under the conditions of applicable international law.
- 3) Taking operational measures against vessels and related assets suspected of being used for human smuggling or trafficking inside a state's territorial waters.
- 4) The withdrawal of forces and completion of the operation in March 2020.<sup>9</sup>

Op Sophia conducted new surveillance activities on illegal trafficking of oil exports from Libya (in accordance with UN Security Council resolutions). It also established a monitoring mechanism for the long-term efficiency of the training of the LCG and Libyan

Navy.<sup>10</sup>

All of the activities undertaken in each phase adhered to and respected international law, including human rights, humanitarian and refugee law, and the 'non refoulement' principle meaning that no rescued persons can be disembarked in a third country. The EU enables all Member States, regardless of size, to make meaningful and effective contributions.<sup>11</sup>

## Ireland's Key Role

From 2015 to 2018 Ireland went from being a non-military contributor to one of the top five EU contributors in Op Sophia with four ships, each with 57 crew, plus two Operational HQ appointments in Rome, and two Force HQ appointments aboard the Italian aircraft carrier Cavour and then the Italian cruiser San Marco.<sup>12</sup>

Ireland has maintained a peacekeeping presence around the world for over 60 years.<sup>13</sup> Nonetheless, when Ireland deployed the offshore patrol vessel LÉ Niamh to Operation Sophia in October 2017 it was the first time an Irish Naval Service asset had been involved overseas as a part of

<sup>5</sup> For more information about the Irish Defence Forces and overseas deployments, see: [www.military.ie/en/overseas-deployments/](http://www.military.ie/en/overseas-deployments/)

<sup>6</sup> Commander Caoimhin MacUnfraidh, "Operation Sophia, EUNAVFOR Med," *An Cosantóir* (March 2020), 14-16. For an analysis of Operation Sophia's evolution in light of the emergent legal and political complexities, and the addition of United Nation's authorised maritime security tasks see: Capt (NS) Burke, Pat "EUNAVFOR MED Operation Sophia – An Impossible Challenge?" *Irish Defence Forces: Defence Forces Review* (2020): 131-141.

<sup>7</sup> See: [www.frontex.europa.eu](http://www.frontex.europa.eu)

<sup>8</sup> See: [www.europol.europa.eu](http://www.europol.europa.eu)

<sup>10</sup> EEAS, op.cit.

<sup>10</sup> EEAS, op.cit.

<sup>11</sup> For more information and analysis see: Caoimhin MacUnfraidh, op.cit.

The EU has further expanded its maritime operations in January 2021 with the 'Coordinated Maritime Presences concept in the Gulf of Guinea', reflecting how security concerns at sea near to and afar from the EU affect directly the EU's security. ( See:[www.eeas.europa.eu/topics/maritime-security\\_en](http://www.eeas.europa.eu/topics/maritime-security_en)) For an analysis of the background see: Commander Corrado Campana "Maritime crime in the Gulf of Guinea. Experience from the Somali Basin," *NMIOTC Journal* 9, (2014): 33-35. [www.nmiotc.nato.int/wp-content/uploads/2018/09/NMIOTCjournal91.pdf](http://www.nmiotc.nato.int/wp-content/uploads/2018/09/NMIOTCjournal91.pdf)

For more information and analysis of EU security and military operations see: *EU Security Strategies: Extending the EU System of Security Governance*, edited by Spyros Economides and James Sperling. London: Routledge, 2019.

<sup>12</sup> For more information see: Caoimhin MacUnfraidh, op.cit.

<sup>13</sup> For a comprehensive analysis of Ireland's role in UN peacekeeping globally see the dedicated edition of *Defence Forces Review* (2018), at: [www.military.ie/en/public-information/publications/defence-forces-review/df\\_review\\_18.pdf](http://www.military.ie/en/public-information/publications/defence-forces-review/df_review_18.pdf)

See also, Government of Ireland, *White Paper on Defence (Update, 2019)* at: [www.gov.ie/en/publication/a519cf-white-paper-on-defence-update-2019/](http://www.gov.ie/en/publication/a519cf-white-paper-on-defence-update-2019/)



a multinational mission.<sup>14</sup> However, this was not the first time the LÉ Niamh had been to the central Mediterranean, having displayed her prowess during Operation PONTUS,<sup>15</sup> a bilateral arrangement with the Italian government. Therefore, the transition for the Irish Naval Service to promote maritime peace and security beyond its shores and into the Mediterranean was somewhat of a natural evolution. Indeed, the Naval Service has honed its core mariner skills over many decades in one of the toughest environments in the world: the North Atlantic.<sup>16</sup> As Irish Defence Forces Chief of Staff Vice Admiral Mark Mellett states:

"Over the decades we've refined the skills of launching and recovering boats in, what are statistically, some of the roughest seas in the world... the largest wave ever measured by scientific instruments was off the northwest coast of Ireland...in excess of 29 m [over 95 ft]."<sup>17</sup>

It was these very attributes and acuity that were the rudiments for Naval Service assets to take up station in Operation Sophia. These skill sets which were developed during fundamental domestic framework operations - conducted in the unforgiving North Atlantic environment - laid the foundations for successful search and rescue/recovery (SAR), intelligence gathering, and friendly approaches<sup>18</sup> (Boarding & MIO - Maritime Interdiction Operations), on Vessels of Interest (VOI). It was this ability to complete indispensable maritime tasks within the EU's framework which confirmed that the Irish Naval Service could operate as a first class military, leading the way in disrupting the business model of illegal trafficking. Moreover, as the coauthor of this article states:

"As the Irish liaison to the Force Commander during my four month

deployment, it was the Irish ships who conducted all six of the friendly approaches, a testament to the crews".<sup>19</sup>

### Operational Resources

Since the inception of Op Sophia over 58 naval units have participated, including four Irish ships: the offshore patrol vessels LÉ Eithne (P31), LÉ Niamh (P52), LÉ Samuel Beckett (P61), and LÉ James Joyce (P62). Op Sophia was the first time Ireland has taken part in a multi-role and multinational naval operation.<sup>20</sup>

Force Headquarters (FHQ) was aboard ITS San Marco L 9893, a San Giorgio-class Amphibious Transport /Landing Platform Dock (LPD). San Marco was launched in 1987 with Brindisi as the ship's home port of assignment. The ship could accommodate five hundred and eight (508) personnel including crew, marines, flight crew and SOF (Special Operations Forces), as well as the FHQ Staff. San Marco's landing deck proved to be an ideal placement for SOF sniper teams supporting boarding and MIO operations. Fittingly, San Marco's motto was:

**TI CON NU - NU CON TI - "You with us - We with you"**,

written in old Venetian language; this tied nicely into the context of the mission. ITS San Marco had taken over the FHQ flagship duties from

<sup>14</sup> For more info on the Irish Naval Service, see The Irish Defence Forces at: [www.military.ie/en/who-we-are/naval-service/](http://www.military.ie/en/who-we-are/naval-service/)

<sup>15</sup> For further information and analysis on Op PONTUS see: Brunicardi, Michael. "Operation PONTUS: an eye witness account from on board L.É. NIAMH." In *Haven: The Mediterranean Crisis and Human Security*, edited by John Morrissey, Chapter 8. Cheltenham: Edward Elgar Publishing Ltd, 2020.

<sup>16</sup> For background historical analysis see: Mclvor, Aidan. *A History of the Irish Naval Service*. Dublin: Irish Academic Press, 1994.

<sup>17</sup> Vice Admiral Dr Mark Mellett DSM, Irish Defence Forces Chief of Staff, August 9, 2020. Interview with Dr Maxim Kozachenko, GEOCOAST. Available at: [www.youtube.com/watch?v=c6LGjksQgws&ab\\_channel=GEOCOAST](https://www.youtube.com/watch?v=c6LGjksQgws&ab_channel=GEOCOAST)

<sup>18</sup> For more information on the types of approaches and legal environment of MIO see:

Rear Adm. Eugene Diaz del Rio, "Maritime Security & Law Enforcement," *NMIOTC Journal* 9, (2014): 42-43, [www.nmiotc.nato.int/wp-content/uploads/2018/09/NMIOTCjournal91.pdf](http://www.nmiotc.nato.int/wp-content/uploads/2018/09/NMIOTCjournal91.pdf)

<sup>19</sup> Lt Cdr Tony O'Regan. Two Irish Naval Service personnel were on board the FHQ - One Officer and one NCO. The NCO originally worked as the Ops room manager and later became a battle room watch keeper. Ireland maintained two Naval Service personnel in the FHQ throughout Op Sophia.

<sup>20</sup> Caoimhin MacUnfraidh, op.cit.

the ITS San Giusto L9894 in August 2018 from her predecessor the aircraft carrier ITS Cavour. ITS San Marco was relieved by ITS Luigi Rizzo F595, Bergamini Class (FREMM) general purpose frigate in January 2019 remained as the FHQ at sea until April 2, 2019.

Article coauthor Lt Cdr Tony O'Regan states that having spent many years at sea conducting domestic Maritime Defence and Security Operations (MDSO) in Ireland's Area of Operations (AO), and as a specialist clearance diver, his selection to ITS San Marco Force Headquarters (FHQ) Op Sophia presented a new and challenging role:



"Although my role was now somewhat different, it's that innate ability to adapt to changing situations made it all the more interesting. Now at the tactical level in the FHQ there were fifteen nationalities to contend with, continuous personnel updates (persrep) to the Operational HQ Rome (OHQ), daily briefings to the Force Commander, and maintenance of the daily battle rhythm. The administration required in a multinational force and military staff work to preserve the FHQ, maritime assets and air assets in mission at all times made the CJ1 appointment a demanding role."<sup>21</sup>

### Particular challenges of Op Sophia

Op Sophia required more than a degree of flexibility, both in terms of professional and personal approaches. Maritime missions are by their nature complex, where any uncertainty at the strategic level can, and inevitably will, feed into both the operational and tactical level. By late 2018 the mission was surrounded by uncertainty about

its continuance. This uncertainty brought with it challenges to crews that were already operating far from home in a hostile environment.

However, the greatest challenge faced was not disrupting the business model of human trafficking or the arms embargo to Libya, but the humanitarian crisis - especially having to deal with capsizing vessels and hundreds of persons in the water.

"We are sailors representing the Irish Naval Service and the Defence Forces of Ireland and with that comes a duty of care coupled with a sense of responsibility to protect others and save lives at sea. It was these situations in my opinion that had a profound effect and left a deep impression on almost all of the personnel involved."<sup>22</sup>

Many in the Irish Naval Service (particularly the ships' crews), will say the most rewarding aspect of Operation Sophia was their involvement

in SAR and saving lives at sea. Notwithstanding UNCLOS article 98,<sup>23</sup> this ethos is engrained in every Irish sailor and serviceperson. The mission itself proved to be very significant in terms of operational experience and development for the Naval Service and its personnel. As well as being within the top five Op Sophia EU contributors, Irish personnel and Naval Service assets came to the fore developing a significant positive public reputation. Representing Ireland and the Naval Service in its first multinational naval mission, performing to the very highest standards, was hugely rewarding; those who contributed should look back with a sense of pride. Sir Isaac Newton's metaphor sums the experience up perfectly 'If I have seen further, it is by standing on the shoulders of giants'. Tony O'Regan adds: "As I look back, we - Ireland Inc - were de facto those giants". As Vice Adm. Mark Mellett states:

"We bring our capability to bear...to

<sup>21</sup> Tony O'Regan, op.cit. As an Operations Officer Lt Cdr Tony O'Regan had just completed a two year term in Command of L.E. Ciara (P42 Peacock Class- formerly RN HMS Swallow P242) when he was appointed to the Assistant Chief of Staff (ACOS) CJ1 with responsibility for personnel and administrative duties on board the Force HQ - ITS San Marco (L9893).

<sup>22</sup> Tony O'Regan, op.cit.

<sup>23</sup> See: United Nations Convention on the Law of the Sea at: [www.un.org/depts/los/convention\\_agreements/texts/unclos/unclos\\_e.pdf](http://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf)

undermine the criminality associated with people smuggling and people trafficking which is one of the biggest tragedies in recent years that has been happening in the context of the migration patterns in Europe. And there is a misery associated with criminals and networks exploiting the challenging circumstances of people who are forced out [of their countries] for a variety of reasons to try and cross challenging seas like the Mediterranean...The overwhelming challenge in that period was to deal with the massive numbers we had...in terms of saving lives. We have saved, as the Defence Forces, around 18,000 people in the Mediterranean."<sup>24</sup>

### EU framework and relationship with NATO Sea Guardian

Operation Sophia coordinated closely with NATO maritime security Operation Sea Guardian (OSG) which ran concurrently. NATO OSG has been implemented in response to the evolving maritime security environment in the Mediterranean. OSG is characterised as a flexible operation and adopts a comprehensive approach to the Maritime Security Operations,

including multi-domain connections to optimise Maritime Situational Awareness. This maritime information was reported to its headquarters, Allied Maritime Command (MARCOM) where it was processed and shared among the allies and partners' navies and with EU Op SOPHIA. Moreover, this coordination with Op SOPHIA increased the efficiency of both EU and NATO operations, enabling tactical level coordination utilising continuous information exchange. NATO and the EU shared daily situation reports and sailing intentions as well as schedules for air, surface and submarine operations. Sharing this information helped prevent duplication in tasks and built a bigger picture of maritime activities in the central Mediterranean.<sup>25</sup>

Militaries - particularly navies - often have very similar approaches to the specific mission framework when participating in operations. In this case it was EU CSDP - Common Security and Defence Policy.<sup>26</sup> Each Member State or participating nation maintained essential caveats imposed by their respective governments during Op Sophia. The personnel

from participating countries onboard the FHQ worked very well together, particularly at the tactical level where at times there was clear cross-pollination and interoperability; each designated department would feed into each other, providing a holistic approach to the task at hand. For example CJ1 (Personnel) and CJ4 (Logistics) worked cheek by jowl, particularly when ITS San Marco required refuelling at sea. This interaction was conducted by a US Navy resupply ship operating in the Mediterranean, usually supporting NATO's Operation Sea Guardian which was running concurrently. As part of its mandate, OSG supported the EU's Operation Sophia by providing logistical support.<sup>27</sup> "This inevitably led to information sharing in order to provide maritime situational awareness and to most efficiently utilize assets in the central Mediterranean."

The EU Naval Force Mediterranean Operation IRINI (EUNAVFOR MED IRINI), replaced Operation Sophia on March 31, 2020 with the aim to enforce the United Nations arms embargo on Libya. Led by Cmdre Theodoros Mikropoulos at sea and Rear Adm. Fabio Agostini at OHQ Rome, Op IRINI - like Op Sophia - is a European Union military operation under the umbrella of CSDP, taking full advantage of maritime, aerial and satellite assets. Greece took command of Op IRINI in October 2020. Op IRINI continues the very close liaison with NATO OSG which began with Op Sophia, enabling the greatest possible efficiency and utilisation of NATO and EU resources.<sup>28</sup>



<sup>24</sup> Vice Adm. Mark Mellett, op.cit.

<sup>25</sup> See: NATO MARCOM OSG at: [www.mc.nato.int/missions/operation-sea-guardian](http://www.mc.nato.int/missions/operation-sea-guardian)

<sup>26</sup> For more about CSDP, see European External Action Service (EEAS), at: [www.eeas.europa.eu/topics/common-security-and-defence-policy-csdp\\_en](http://www.eeas.europa.eu/topics/common-security-and-defence-policy-csdp_en)

<sup>27</sup> NATO MARCOM OSG, op.cit.

<sup>28</sup> See: European Union External Action Service (EEAS): OP EU NAVFOR MED IRINI at: [www.operationirini.eu](http://www.operationirini.eu)



Admiral Mark Mellett states: "Tragically we've seen hundreds of people drown and we recovered many bodies."<sup>29</sup>

The Mediterranean route is likely to continue to be utilized by traffickers wishing to profit from human suffering. Nonetheless, while the challenges are substantial, EUNAVFOR MED, Operation IRINI, and other military and civilian missions and operations across Europe, Africa, and Asia as part of the Common Security and Defence Policy enable all countries across the EU, regardless of size, to utilize their expertise and experience. This is highly beneficial not just for the EU and partners including NATO, but for those being exploited by gangs, criminals and terrorist networks. EUNAVFOR Med / Operation Sophia was both an excellent example of this response to the new asymmetric challenges we face, and a building block for the future in EU and international cooperation for the Republic of Ireland.

**Conclusions**

Operation Sophia placed Ireland on a national and International stage, working alongside and in cooperation with other EU as well as NATO navies - developing closer interoperability and an ever closer working relationship between the EU and NATO. This contribution manifested in a way far

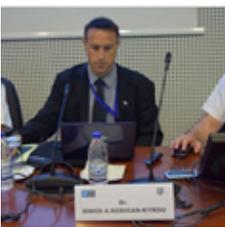
beyond the actual size of the country. It built on Ireland's excellent reputation in international affairs combined with substantial, practical experience at sea, especially within the vast North Atlantic environment. But the challenges are, without doubt, long-term and will remain for many years. While thousands were indeed saved in Op Sophia and Op PONTUS, as Vice

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Lt Commander (OF-3) Tony O'Regan MCDO is a Irish Naval Service Officer with 27 years' service. He has a wealth of seagoing experience culminating in his appointment as Officer Commanding L.E. Ciara from 2016-2018. His specialization as a Clearance Diver and in his capacity as Officer in Charge of Ireland's Naval Diving Section has seen Lt Cdr O'Regan involved in some of Ireland's prolific maritime operations. He is a graduate of the Defence Forces Command and Staff School and holds a Masters in Leadership, Management and Defence Studies and a diploma in sports psychology. From September 2018 to January 2019 he held the appointment as ACOS CJ1 on board the Force Headquarters for Operation Sophia.



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<sup>29</sup> Vice Adm. Mark Mellett, op.cit.



## *Augmenting Maritime Command and Control over a Regional Common Information Sharing Environment Implementation: Montenegro Case*

by Zdravko Paladin<sup>1</sup>, Andrej Mihailović<sup>1,2</sup>, IEEE Member, Nexhat Kapidani<sup>1</sup>, David Merino Delgado<sup>3</sup>, Juan Manuel Grenner Nogueron<sup>3</sup>, Giuseppe Vella<sup>4</sup>, Marios Moutzouris<sup>5</sup>, Roberto Leuzzi<sup>6,7</sup>, IEEE Member

### **Abstract**

Implementations of the rising EU maritime initiative, namely the Common Information Sharing Environment (CISE), involves network connectivity and data sharing processes among EU Member States agencies. These interactions occur at the national, regional and international levels with the principal purpose to increase maritime borders safety, security and effectiveness. The developed infrastructure of the CISE application augments the use of maritime Command and Control (C2) functions, enabling an enhanced Common Operational Picture (COP), monitoring, interoperability, improved situational awareness, and safety/security missions. We outline a

case of regional interconnections of maritime surveillance systems and data sources integrated via CISE network within collaborations of Maritime Authorities, border control agencies, IT industry and researchers participating in the international EU ANDROMEDA H2020 project. This paper presents the operations of the Administration for Maritime Safety and Port Management of Montenegro (AMSPM), partner and an end-user in the ANDROMEDA project, during C2 systems' exploitation in the maritime safety domain. Specifically, the regional Adriatic-Ionian integration of maritime authorities' legacy systems for monitoring and surveillance, with the application of high-level operational C2 systems, fully compliant to the enhanced maritime CISE data model,

is proposed in order to valorise regional potentials from strategic and safety aspects. We provide some experiences/results of maritime C2 operations and use cases in AMSPM during the Adriatic-Ionian trial period of the ANDROMEDA project, showing the potential benefits of integrating Montenegro, as an EU candidate country, in the regional CISE network. Thus, EU agencies have interests in the proposed CISE extension, since Montenegro provides great potentials for information exchange contributions to the EU CISE network's full operability.

*Key words: CISE, C2, regional cooperation, maritime safety*

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## I. INTRODUCTION

The need to broaden regional interconnections between maritime and land safety and security agencies has been recognised by many EU and surrounding countries. This is especially triggered by various challenges facing Europe at the beginning of the XXI century. Contemporary EU states and agencies, being aware of various issues arising due to the exposure of its southern border, have launched various initiatives for interagency cooperation based on institutional network of responsible stakeholders. These issues are maritime risks, possible criminal threats (piracy, smuggling), massive illegal migrations, environmental issues (oil pollution), illegal fishing etc. The aim is thus to create an integrated framework programme with close cooperation of public administrative bodies of the regional countries in order to raise maritime safety and security level and suppress the rate of adverse impacts of maritime events.

Among many initiatives for connectivity of maritime sectors of regional countries, the most important and prominent one is the Common Information Sharing Environment (CISE). This initiative, complementarily with the EUROSUR network, should enhance the processes of international and inter-sectoral exchange of information. The prioritised aim of the CISE is to protect maritime borders and distribute the information to other inter/national authorities based on several types of the CISE Data and Service models.

Also, it is important to note that Adriatic – Ionian seas and countries gravitating towards this region represent a strategically important segment of the European maritime transport system, which need to be fully integrated into the networking initiatives of the European Union. Therefore, countries of the Western Balkans, which also include Montenegro, are taking proactive efforts for connectivity schemes and programmes for better

international cooperation, especially in the domains of safe and secure maritime traffic, its overall surveillance, control and management. To this end, there are many development and investment projects which aim to foster integrated maritime surveillance and management efficiency of the governing administrative bodies. Some of these are: VTMS in Montenegro and Albania, maritime transport connectivity projects for South Adriatic countries (Italy-Montenegro-Albania), the introduction of National Maritime Single Window (NMSW) in Montenegro, etc ([1],[2],[3]). All these activities are directed towards digitalisation strategy implementation for creating a sustainable and interoperable maritime business environment with the use of intelligent ICT in maritime clusters [4]. The current situation in the introduction of advanced maritime information technologies shows that the Western Balkan region has significant potentials for connectivity with EU member states, which need to be further intensified in maritime safety and surveillance domains coordination based on VTMS and NMSW ([2],[3]), as well as through the full involvement of EU pre-accessing countries (Montenegro) in CISE network and stakeholders groups. Alongside, the Administration for Maritime Safety and Port Management of Montenegro (AMSPM) partners in research projects in the area of autonomous marine vehicles and UxVs disruptive technologies' application as sea surveillance assets ([5],[6]).

Here we continue the analysis of the possibility for extending the EU CISE network adaptations to AMSPM of Montenegro, which participates in EU project ANDROMEDA (Horizon2020) described in [7] and [8]. We also review command and control functions augmentation over CISE. This paper unfolds as follows: in Section II we give a more detailed overview of the CISE initiative and the network architecture in the context of EU guidelines and regulations; Section III considers

the regional interconnections and deployed command and control systems from maritime safety aspects; Section IV presents the AMSPM involvement in the Adriatic-Ionian trial through adapted regional CISE network via special C2 software; finally in Section V we give concluding remarks.

## II. CISE INITIATIVE AND NETWORK ARCHITECTURE

Originally, the CISE initiative was outlined in European Commission documents and guidance as a voluntarily connection network between relevant entities within same or related competencies for common sharing of important information and according to the principle "sharing on a need-to-know and responsibility-to-share basis" subject to EU legal provisions [9]. It is pointed out that CISE is not a system, but rather a connection platform/interfacing tool between many different data sources of EU agencies which, through their individual legacy systems, established cooperation and communication related to the identified areas of mutual interest in a decentralised manner. This initiative has been started in 2010, under the COM (2009) 538 [9], which sets out the guidance principles and a roadmap for establishing a comprehensive environment for information sharing in the area of maritime surveillance. Primarily, CISE roadmap document emphasises the need for generating situational awareness for events at sea, by interconnecting the maritime safety and security, border control and defence, maritime environment and transport in EU, and all this to facilitate the decision making process using the improved, high level technology readiness software solutions. Therefore, it is expected that full multidisciplinary implementation of the CISE initiative contributes with:

- widened Common Operational Picture (COP),
- flexible information sharing

environment and protocols with inputs of necessary national/international data,

- higher efficiency of EU Member states authorities (from both civilian and military) integration,
- development of national maritime (civil-military) safety and security coordination centres and its collaborations,
- non-hierarchical framework of interoperability,
- improved interoperability with EUROSUR, MARSUR, SafeSeaNet, Maritime Security Programme (MASE), etc.
- safety and security of maritime transport, navigation, various operations (including SAR) and events at sea,
- risk management and crisis response, as well as,
- Cost effectiveness.

Further to these guidelines, the general CISE network (Figure 1), as a transmission tool for point-to-point data transfers. It should be based on multi-layered platform able to exchange and distribute relevant information collected from various, often different operational systems and data sensors of user communities. It is designed by envisaging a technical framework with already existing ICT Legacy Systems (LS) (e.g. VTMS, NMSW, C2/C3i, Radar, VMS, UxV, electro-optical and security systems, and other surveillance assets) in user organisations on an interoperable base for sharing certain data types' content. This integration process will establish the comprehensive 'maritime situational awareness' onto surveillance and security with improved early warning and facilitation of timely responses at sea, and, having a regard for regional priorities ([10],[11]).

Since the legacy system is the fundamental block of elements in the CISE Network Hybrid Architecture, the next one should be a special CISE Adaptor which through its particular communication protocol connects with a LS (e.g. VTMS maritime data of AMSPM could be transferred via Inter VTS Exchange Format – IVEF). It enables translations of LS data to the CISE Data and Service Model and vice versa. Furthermore, the connection between CISE Adaptor and CISE Network is done by CISE Node/Gateway (i.e. CISE compliant software). Originally, the CISE Node was developed within EUCISE 2020 project, as a maritime test-bed for information sharing founded in the frame of pre-operational FP7 Programme. This block is responsible for decentralised management of messages obtained by partners' LS via the CISE Adaptor and its distribution to the CISE network. It performs communication services (core, common and advanced) based on CISE Data and Services model, which enable technical and semantic interoperability among the CISE stakeholders. Thus, the node does not store information, it is only a distributor of allowed information, which are mostly located in LS or in the CISE Adaptor, depending on implementation of sharing actions by a CISE Participant. Also, the CISE Nodes and its software components (e.g. Apache ActiveMQ, HSQL Database, Jboss, Wildfly, Nagios, Docker, database servers, etc) communicate through VPN using the means of Internet transport and IPSEC for securing all the information distributed among CISE network participants [12]. The communications between participants in the CISE network

(one/several actors on consumer/provider sides) have several patterns such as: pull (request for consuming the information from provider), push (providing an information to consumer upon request), pull/push unknown (for receiving/sending the information without exactly knowing the consumer/provider), publish/subscribe (for continual sending/receiving information from/to consumer/provider), and, acknowledgements.

Depending on each country's technical infrastructure and preferences, the general CISE network could be established in the following organisational structures [12]:

- a. Direct connection to the CISE Network (with own CISE Adaptor and CISE Node),
- b. Direct connection to the CISE Network using a shared CISE Node (two or more Adaptors through one Node),
- c. Connection through National Node (LS connected to one national Node, connected to one Adaptor and following CISE Node to CISE Network),
- d. Connection through a Regional/European CISE Node.

### III. REGIONAL INTERCONNECTION BASED ON MARITIME COMMAND AND CONTROL SYSTEMS

#### A. Initiative for regional connections in CISE network

As already suggested, EU Member states in the CISE network should ensure the interoperability between sectoral information exchange systems at the national and EU levels (based upon the principles of collaboration and cooperation and by establishing protocols, authorisations and protections), in line with the European Interoperability Reference Architecture [10]. Following this recommendation, we emphasise the importance of close or neighbouring-to-EU regional interconnections based on CISE benefits and strategy.

Also, the possibilities to make a small



Figure 1. General structure of the CISE network, copied from [12]

regional CISE node for stronger collaborations between countries that share the same sea area, and, for jointly exploiting the potentials of CISE should be further explored. According to the proposed variants of involvement within the CISE network, special attention should be paid to option d, that considers using the Regional/European Node and/or **proxy owned external CISE Node** to connect to the CISE Network (e.g. AMSPM can be a gateway for connection to CISE Network through an external EU partner) (discussed in [7]) (Figure 2).

to manage the delivery of the CISE services. In this case, Member State has a single authority provider of the CISE services, which can also be provided by EU led initiatives. Therefore, a single integrated maritime awareness picture can be offered per Member State, which comprehends all other sectors such as border control, defence, marine pollution, customs, fisheries, law enforcement [13] (Figure 3).

Following this approach and proposing the extension of CISE clusters to

surveillance in Montenegro, appointed as a single CISE provider, could be an anchor point for CISE data and services transfer to other national authorities. Furthermore, the CISE messages would be distributed to the Adriatic-Ionian Regional Node which will, through CISE Adaptors, exchange the information with the CISE Node(s) and Network, subsequently. This proposal is assumed to positively impact CISE connections between the regional maritime authorities and their equal participation in the CISE stakeholders group to make CISE initiative fully operational as planned by the European Commission. Therefore, by implementing this CISE extension through EU investments and research projects supported by JRC, EMSA, FRONTEX and software technical partners, the participating Adriatic countries will fruit many advantages of CISE Network. The most important benefits here would be maritime domain safety and border security integrations based on new ICT technologies with augmented C2, Data Fusion, Analytics and Decision Making capabilities, and cyber security as well.

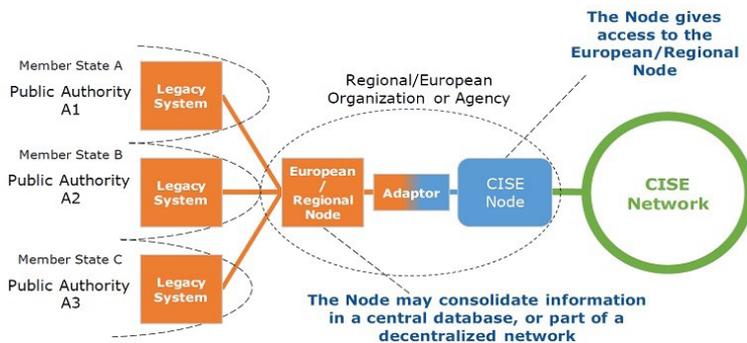


Figure 2. An example structure when several authorities are connected via one (CISE) Adaptor to CISE Node, copied from [12]

From the aspect of CISE Node organisation and based on the previous organisational structure, there have been defined several visions of CISE architecture (A, B, C, and hybrid) and integrations with national authorities. Among these visions, and based on the user needs investigation, the most IT sustainable, cost-effective and wide coverable one, is the Vision C (corresponding with structure b in II section). It proposes a governance model with each Member State's appointed single authority

EU neighbouring and accessing regions (e.g. Adriatic-Ionian east-coast countries, and particularly, Montenegro), the most optimal solution would be designing a hybrid CISE connection, based on agreed combination of abovementioned options b and d for Regional Node, approximated to Model 4 (National Single node connected to Regional/EU Adriatic CISE Node) in [14]. In this case, AMSPM, as a National Competent Authority (NCA) for maritime safety and marine traffic

*B. C2 systems exploitation in regional agencies integrations – Maritime Safety aspects*

After determining the maritime CISE network and operational objectives and setting up the necessary infrastructure components in the particular regions, the next step is designing the software solutions. This shall comprise the highly developed interfaces for visibility of communication and information sharing among providers with various data sources. To this end, under the use cases defined by maritime agencies and their operational requirements, the special multi-layered platforms in the form of C2 systems are installed and operated by Coordination Centres of CISE Member states. These C2 systems, based on the CISE architecture guidance and interoperability principles, contain

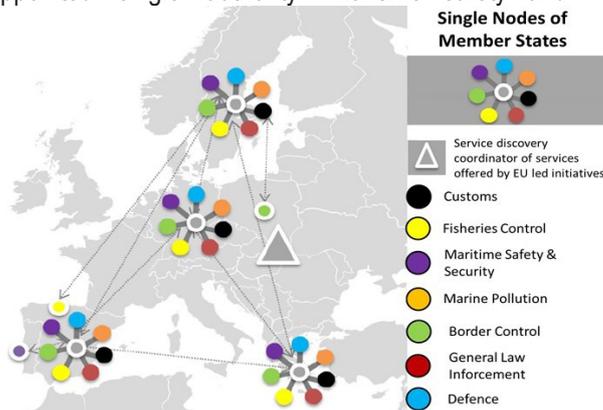


Figure 3. Single National Providers of CISE Services (+ EU initiatives) – Vision C, copied from [13]

all provided functions for timely, accurate, comprehensive and cyber-secured information sharing. This enables the COP to be seen by all linked national and EU institutions/entities participating in CISE regional/EU network. Therefore, the main objective of C2 development is to enable all responsible authorities to have joint access to the CISE Network which functions as data hub adapted for retrieval/sharing of relevant information, visible by a web/installed application, and to exchange sensitive cyber data, services and information they need for various missions at sea ([15],[16]).

Primarily, every C2 programme has a military background since they were developed to enable the defence and security organisations to manage various tactical and strategic operations on sea or land and share the information with strategically important partners [17]. Therefore, the C2 information exchange systems should firstly satisfy the criteria of interoperability, for instance with EUROSUR (owned by FRONTEX) and MARSUR (owned by EDA). Following these features of cooperation in maritime security domain, the exploitation of C2 programmes is also intrinsic in maritime safety and traffic surveillance, environmental protection areas as well, in order to fully connect all relevant sectors into one COP monitored by maritime safety authorities.

The C2 software, deployed in growing maritime safety applications, generate a high quality real-time maritime situational picture comprehending the following:

- enhanced Search-and-Rescue (SAR) functions compliant with GMDSS,
- adequate maritime traffic surveillance (by using integrated sensors & external systems),
- appreciation of tactical situation based on novel decision support tools (DST) design, which enables MRCC and VTS services to persistently control responsibility area

and

- quick response to dynamic safety threats and risks by exchanging relevant information with security sector.

Considering the CISE architecture and its regional extension, C2 systems (if they are not considered as existing LS) could be positioned in a design between already existing LS – Data Sources, and CISE Network Adaptors. Thus, a C2 receives data from another LS via CISE features and processes this data by using its own system resources such as Data Fusion (DF) and DST for completion of a maritime awareness picture and according to the entities modelled in CISE Data and Services Model Architecture.

#### IV. MONTENEGRO CASE STUDY

Administration for Maritime Safety and Port Management of Montenegro is NCA for: maritime traffic surveillance (with management of VTMIS), SAR, environmental protection as well as aids in navigation maintenance. Montenegro, over AMSPM, is part of EU LRIT Data Centre, CleanSeaNet, AIS/MAREΣ (for communication with EU and EMSA) and IMS (Integrated Maritime Services). Despite Montenegro's EU candidate status, there are many related important projects in the pre-accession schemes, out of which the most important ones, under the AMSPM responsibilities, are: IPA II and EUREKA (IPA ADRION Project); the CISE based ones like ANDROMEDA ([www.andromeda-project.eu](http://www.andromeda-project.eu)), (pivotal project for Montenegro since it is not a member of CISE Stakeholder Group), and EFFECTOR ([www.effector-project.eu](http://www.effector-project.eu)); RESPOND-A ([www.respond-a-project.eu](http://www.respond-a-project.eu)), related to SAR equipment and AR training; ePcenter ([www.epicenterproject.eu](http://www.epicenterproject.eu)), partly for NMSW; and the very significant one COMPASS2020 ([www.compass2020-project.eu](http://www.compass2020-project.eu)) (Horizon2020), which deals with persistent maritime surveillance assets together with deployment of UxVs ([5], [6],[18]). These projects

tend to foster research results implementations and organisational efforts towards preparations for future involvement in the CISE Stakeholder Group, implementation of the CISE network, NMSW and other relevant maritime surveillance assets development. Specifically, AMSPM is involved in the ANDROMEDA project consortium within its end-users group, with key contributions in user requirements, testing and validation of the CISE trials (Figure 4). In the ANDROMEDA project, the followed design was NATO Architectural Frame NAFv3 ([19],[20]). Furthermore, the integrated C2 capabilities in this project comprehended data collection (geodata, tracks video), their fusion, analysis (e.g. vessel abnormal behaviour, rule engine), dissemination (e.g. by terrain and feature streaming, EUCISE), decision making process and missions planning as well.

##### A. CISE Trials implementation

An enhanced CISE Data and Services model (e-CISE v2.2.0) deployed in the ANDROMEDA project relies on the original CISE model of maritime domain entities (such as objects, location, agent, risks, document, event, period) with extended scope to land domain surveillance objects and relevant entities exchange. Particularly, AMSPM (using Socrates C2 developed by GMV) being included in the Adriatic-Ionian Maritime Border Trial executed in March 2021, and together with Italian Navy – ITN (using SMART C2 developed by Engineering Ingegneria Informatica Sp.A. Company), Hellenic Navy – HN and Coast Guard – HCG (using ENGAGE C2 developed by SATWAYS Ltd.), validated only maritime use cases and e-CISE model part related to SAR, maritime safety, surveillance and missions. The important feature of AMSPM's involvement in the ANDROMEDA network system is the connection to CISE by proxying the institution's LS as data sources over SOCRATES C2 and Data Fusion

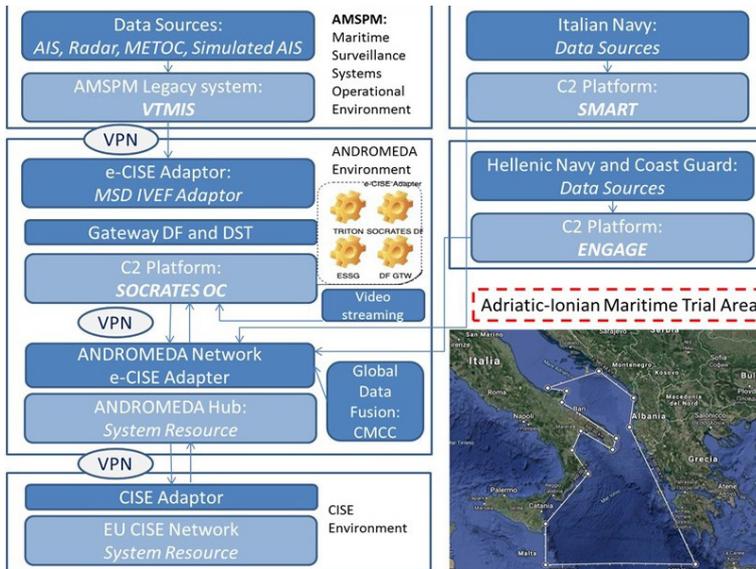


Figure 4. e-CISE Model and Adriatic-Ionian trial architecture

platform, provided and operated by GMV, Spain ([www.gmv.com/en/Products/socrates/](http://www.gmv.com/en/Products/socrates/)) through specific MSD IVEF-to-CISE Adaptor.

In detail, SOCRATES DF Services by GMV consist of a JDL Level 1 fusion as the first step in converting a large amount of received data into useful information. The JDL Level 2, is the Triton Behaviour Analysis Service designed to be tailored by the operator through a set of rules that can be configured and customised. This customisation is done by the Rule Definitions Management Service providing further flexibility, and modifying the parameters of a series of predefined rules [21]. Concerning Fig.4 SOCRATES is interrelated to ANDROMEDA Hub through the Rest Web Service, the relation with Video Streaming is set over a UDP server, while the relation with Gateway DF, Triton and Adaptor Data Sources from AMSPM is set over a Kafka Server meaning that messages from AMSPM LS to SOCRATES are distributed via the Kafka Message Bus. SOCRATES C2 has a very user-friendly graphical interface and facilitates many advantages for information exchanges in the maritime safety and security domains, as proved during extended validation and testing periods. SOCRATES provides an interactive environment

entirely compliant to the e-CISE Data and Services Model with a high level of efficiency and interoperability with other C2 programmes, EUCISE, and other EU initiatives related to maritime surveillance. The structure of this C2 is built by several function blocks optimally connected into the ANDROMEDA network, able to perform and monitor all maritime use cases, satisfy user requirements and provide various mission planning capabilities based on integrated assets and operational systems. Information sharing process management in SOCRATES is enabled by several command functions. All these capabilities were used to test

the scenarios that are incorporated in the Trial implementation, as follows in Table 1 and Figure 5.

Table 1. Tested operational scenarios in Adriatic-Ionian Trial

**SAR #1**

- Detection of vessel near Montenegro coast.
- Identification of vessel emergency status and sharing the alert from AMSPM Socrates C2 to ITN, HN, HCG.
- AMSPM defines a mission with tasks and sources and shares it to HN, HCG.
- Generating and sharing the Report on Mission finished.

**SAR #2**

- Detection of vessel near Greek Ionian coast with emergency alarm on ENGAGE.
- HN creates a track with loitering rule and sharing to AMSPM, HCG and ITN.
- HN defines a SAR mission with rescue teams.
- AMSPM receives the mission to coordinate, generates the Report and shares it with HN.

**Smuggling**

- METOC data displayed by AMSPM to check the favourable position for HT activity in Adriatic sea.
- ITN sends Pull Request with MMSI number to HN and shares the target/anomaly with AMSPM.

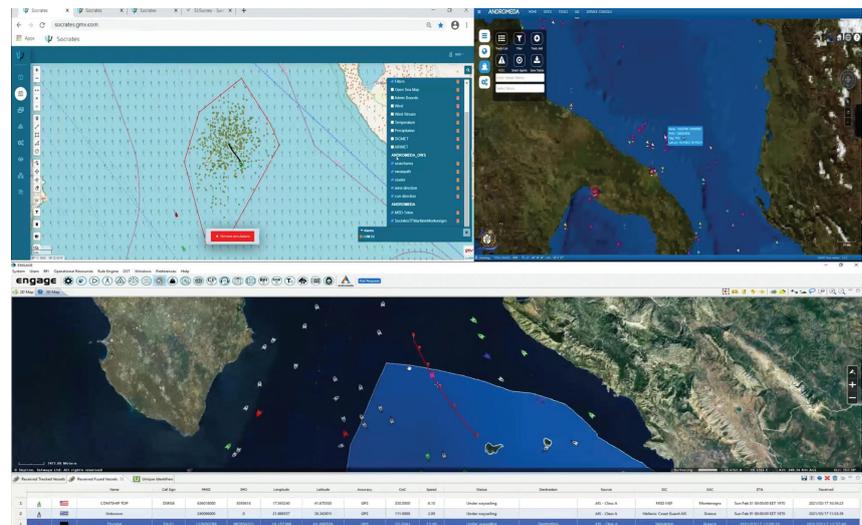


Figure 5. Displays of C2 used in Adriatic-Ionian trial implementation of defined SAR #1 and #2 operational scenarios (SOCRATES upper left, SMART upper right, ENGAGE down centred) (Source: Own. Screenshots were taken during Trial performance)

- SOCRATES operator creates rules, alerts with geometry and WKTs for two vessels

- HN sends media video RFI to AMSPM which requests video streaming, shows it, stores and reverts it to HN.

#### **Illegal fishing**

- Defined WKT area for illegal fishing in Adriatic sea by ITN.

- Identification of vessel performing fishing in the forbidden area. Generated anomaly shared with AMSPM and HCG for taking action.

- ITN sends the anomaly through ECISE to CISE Adaptor (ECCA) to HCG, which creates incident report and assigns patrol boat.

#### **Human Trafficking**

- Anomaly generated for two suspicious vessels near Otranto. Shared by ITN to HN and HCG. Track is marked and monitored.

- AMSPM receives the anomaly and report and generates a route prediction using Socrates C2.

#### **Simulations**

- Simulation services from CMCC provider have been tested within each scenarios steps where defined.

- Drifting (OCEAN-SAR)

- Ship Navigation optimal route (VISIR)

- Weather conditions and current sea state (METOC)

Besides a comprehensive dashboard with monitored statistical information, ANDROMEDA messages registers/logs and standard map screen, SOCRATES further provides a common set of generic capabilities regarding surveillance, mission planning, tasking and reporting. An operator using SOCRATES has the possibility to share entities in two modes. The simplest one is to mark the vessel and share it by selecting the available receivers from the ANDROMEDA network. For continually sharing the same entity, it uses the sharing service tab by entering the relevant parameters in the Sharing Service Editor and the partner to whom the information is pushed.

Regarding the Behaviour Management tab, an operator can create a new rule, edit the area and relevant parameters, launch the monitoring on the map and push the anomalies to selected receivers. The most crucial feature of SOCRATES is mission management with the coordination of scheduled tasks in defined areas. An operator can manage the resource layer with the assets (e.g. SAR boats, aircrafts, MRCC/NCC), create tasks with WKT (Well-known text representation of coordinate reference systems) area located scenarios and handle Request for Information.

Further to the involved C2, in the Adriatic-Ionian trial SMART and ESSG engines have been used as well. SMART C2 is an informative system realised by Engineering Ingegneria Informatica for the Italian Navy with the aim to gather, process and deploy the data concerning the maritime traffic and detect anomalies. SMART provides the means for an effective understanding of all activities carried out at sea that could impact the security, safety, economy or environment of the nation. It provides the users with:

- a comprehensive maritime operational picture, based on networks of sensors sites and centres (local, regional, etc...),
  - integration of data acquired from a number of heterogeneous organisations,
  - full coverage of the area of interest with a wide choice of platforms (coastal, airborne, satellite, etc.) depending on operational requirements,
  - correlation with intelligence data,
  - abnormal behavior detection to support operators,
  - integration of assets (patrol boats, helicopters, aircrafts, etc.),
  - improved resource allocation for greater efficiency and cost savings.
- In particular, the SMART System receives information from a number of external systems, both at a national (NAVY, Coast Guard) and international

(NATO) level. Two core capabilities of SMART are: the System Chart through which the system provides the ability to visualize the related RMP and the Data acquisition and redistribution. By means of this capability the system can acquire and redistribute data according to a number of different application protocols like AIS series messages (only Input), OTH Gold, XCTC, Locator, SISTRAM. Through the Smart Agent capability, SMART allows ITN to create rules for observing and understanding Maritime Abnormal behaviors. In particular the capability Smart Agents and Watchdogs consists of a series of pre-set rules according to which the system reacts with predetermined actions/alerts.

In the specific case of the Adriatic-Ionian Trial, SMART has been integrated with the ESSG data fusion service developed by CODIN to discover divergent behaviours at sea and detect anomalies by applying Artificial Intelligence. ESSG Heuristic Engine is a JDL level 2 DF. The core of the engine consists of an AI modules dedicated to identify and classify anomalies of all vessels in a given area. Precise use of AI is crucial to define anomalies rigorously even without a prior definition of the static rules. With this goal, four classes of anomalies have been defined. Three of them are defined through a Deep Variational AutoEncoder (VAE) [22]: Abnormal behavior is derived from the VAE reconstruction error, i.e. the reconstructed behavior is far from what the VAE learned during the training phase; Divergent and Unstable behaviors are defined over the variation of cluster classification over the time in the space of codes of VAE. A cluster on the space of codes improves data aggregation based on features with high nonlinearity [23]. The fourth class of ESSG anomaly is the Incongruous one, i.e. a vessel that is performing a behavior far from the expected one depending on the declared type. This anomaly is generated by a deep Long Short-Term Memory [24] trained on kinematic

features. The most difficult task during the implementation and training of AI is the general lack of information and the sensibility of the models to the quality of AIS data in the input. To improve the stability of the AI modules, ESSG has been equipped with a series of filters and interpolation algorithms to regularize data. The application of previously defined anomalies is a direct consequence of their definition. In particular, the prediction of the vessel class type from the vessel behavior is directly applied to detect illegal fishing activities; the occurrence of two almost simultaneous instabilities in a very small area is symptomatic of a possible smuggling activity.

To ensure proper neighbourhood coverage of the Ionian-Adriatic Seas, the Hellenic Navy and Hellenic Coast Guard were involved using the ENGAGE BME system developed by SATWAYS Ltd and deployed each at their premises. The ENGAGE BME was connected to other participating agencies using the ANDROMEDA Hub (eCISE) to exchange Missions, Intelligence Reports (video, pdf, text) and vessels of interest. The ENGAGE BME also made use an improved Triton [25] service and SOCRATES DF for anomalous behaviour detection and fusion respectively. The Triton service processes data in real-time (vessels (from any source), land vehicles or persons) and provides a fast response for any suspected behaviours. Rules are configured by the operator in both maritime and land domains to detect over 30 suspicious behaviours and sent them to Triton. Ancillary databases are also used such as weather, vessel routes and vessel information stores to provide additional input when determining whether the behaviour of an object matches a certain pattern. It supports also the combination of rules, e.g. abnormal course change and AIS signal lost. Alerts can be triggered if one of rules are triggered or only when both are triggered.

Finally, the added value to the whole trial comprehended the significant Decision Support Tools (OCEAN-SAR,

VISIR, WITOIL, METOC) provided by Centro Euro-Mediterraneo sui Cambiamenti Climatici Lecce (CMCC) for the global data fusion to enable the simulations for drifting, optimal routing and meteorological predictions, through the ANDROMEDA Network e-CISE adapter. Particularly, OCEAN-SAR is a service provided to support maritime authorities and operational centres during search-and-rescue operations, while the VISIR is a service providing optimized nautical routes in the Mediterranean Sea.

### B. Trial Results

The aim of this trial is to demonstrate interoperability of included C2s with ANDROMEDA Hub network based on e-CISE Model with the evaluation of defined Key Performance Indicators and Measures of Effectiveness of project solutions.

After the trial completion, several surveys have been launched to get more information from end-users related to general survey for the project User Community, e-CISE Data Model,

and features, further developments market/economical implications, C2 and regional authorities cooperation implications as well.

The technical part of the evaluation consisted of confirming the features and capabilities of the structural elements of the ANDROMEDA software solutions and numeric identification of some relevant information exchanges, used tools, and actions taken in the trial scenarios implementation. All the questions were structured according to the Key Performance Areas (Figure 6) and Indicators which were concerned about:

- I. The Architecture (ANDROMEDA C2s and user/role management, sensors, DF and DSP services, open standards, SOA, AEDP-19 standards compliance, and connectivity);
- II. e-CISE Data Model, Interoperability and Information sharing;
- III. Maritime and Land C2, which examined the application, GUI, surveillance and tracking the objects, management of tasks, missions planning, resources, reports/documents/video (live stream),

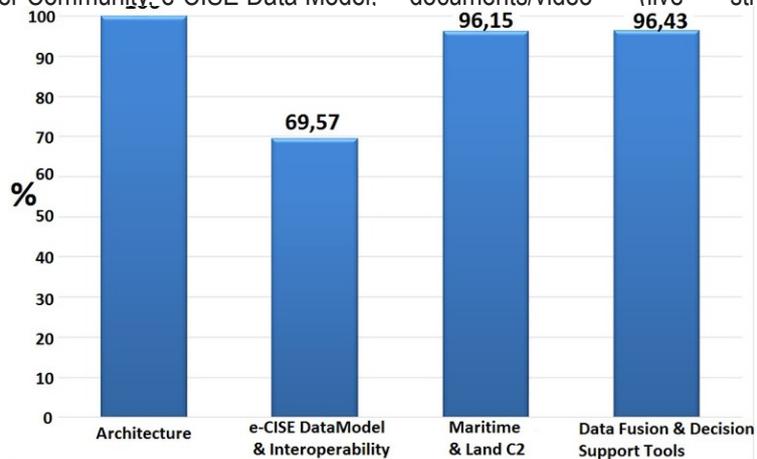


Figure 6. Diagram charts showing surveys results of KPA Compliance in Adriatic – Ionian maritime Trial

general Architecture of the system, ANDROMEDA Land and Maritime C2, and survey for Data Fusion and Decision Support Tool.

Regarding the survey for User Community, there have been collected inputs and estimations about the main advantages of ANDROMEDA, its efficiency in land/maritime surveillance challenges facing, missing capabilities

anomalies, and incidents;

IV. Data Fusion and Decision Support Tools, comprising detection of objects, anomalies, and events, definition of behavior Rules (provided by real-time Triton DF Engine developed by SATWAYS Ltd. company and by the real-time ESSG Heuristic Engine

developed in CODIN SpA), tools for predictions and decision making processes (provided by CMCC). The special examination part concerned the ethics and legal evaluation of the Adriatic-Ionian Trial.

## V. CONCLUSION

Having in mind that the Adriatic-Ionian region is quite a sensitive area since it suffers from intensive illicit flow routes and smuggling, there is a need to fully integrate this maritime and land area into the CISE network using the advanced command and control systems. Participating in the project ANDROMEDA, AMSPM

of Montenegro showed great potential for involvement in regional cooperations with maritime authorities and information exchange based on the CISE and particularly with tested e-CISE model in order to contribute to increasing maritime safety and security levels in the Adriatic Sea. The trial realisation proved successful cooperation and connectivity based on C2 software which implies that augmenting these functions contributes to regional CISE interoperability goals. Both Montenegro and the EU have mutual benefit from collaborating in this strategic area since AMSPM, by inclusion in the EU CISE, would provide significant accomplishment of

EU maritime information data base, hence, strengthening the relations between regional states.

## ACKNOWLEDGMENT

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## AUTHOR

Mr Zdravko Paladin holds Spec.Sci of Maritime Transport degree from Maritime Faculty of Kotor, University of Montenegro and from 2018 he holds MSc diploma in Marine Sciences, graduated as one of the best students at this faculty. He accomplished the internship at Maritime Faculty and has worked in EU projects implementation, HERIC-INVO project as a consultant. From 2019, he works as a project team member and assistant on EU Horizon2020 projects ANDROMEDA and EFFECTOR at Administration for Maritime Safety and Port Management of Montenegro. Also, he has attended training courses related to maritime safety, management and smart ICT technologies in maritime business and transport. His researcher interests are maritime surveillance and safety, CISE, smart marine transportation means and technologies.

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# 12<sup>th</sup> NMIOTC Annual Conference

## Speakers' Inputs

The 12th Annual NMIOTC Conference «Opportunities and threats from Innovative and Disruptive technologies: Shaping the future of Security in the Maritime Domain» was held on June 1-2, 2021 at the NMIOTC in Souda Bay, Crete, Greece. In the beginning Commodore Charalampos THYMIS, the NMIOTC Commandant, welcomed the attendees. This year was another unique experience because COVID kept many of the speakers and participants from attending physically the conference. However, the conference that was conducted in blended mode, with in-person and virtual participation, still presented speakers that delivered valuable knowledge and information about emerging disruptive technology that is necessary for maritime security challenges. Wendi O. Brown, Lieutenant Colonel U.S. Army Reserve, provided this report. (email: 1wendibrown@gmail.com).

### June 1, 2021 –Keynote Speeches

#### **Keynote Speaker: Rear Admiral Rene TAS ACOS Capabilities in Headquarters SACT Norfolk**

We are leaving in a very transformational time and the speed of the change has been increasing in the last decades with big impact in our profession as war fighters. This is especially true in the maritime domain, where innovative technology, such as Artificial Intelligence and unmanned systems, are pushing us to re-evaluate and rethink doctrines and strategies that have been in place since the advent of the modern naval warfare. It is very important for NATO to be at the forefront of this path. NATO has many future programs in place that will enable the Alliance to stay one step ahead in the coming years. One example is the Dynamic Messenger exercise that is an unmanned system exercise planned for 2022 that will be a large-scale test to demonstrate unmanned systems capabilities in the maritime domain and in operational environment. NATO must be prepared for the involvement of new technologies in warfare, including in congested water environment. Our adversaries are planning to challenge us in all domains and we must be prepared to fight in such multidomain scenario. As we deepen the discussion of this topic, everyone will be mindful on how much new and disruptive technology will impact our work in the maritime domain now and in the years to come and also on how we, as the Leadership of the NATO maritime enterprise, are entrusted by all nations to ensure the Alliance remains the global leader in innovation. By doing so we will continue to provide free and safe use of the seas to all our nations, so that prosperity can be maintained and achieved as it has been since the founding of the Alliance over 70 years ago.

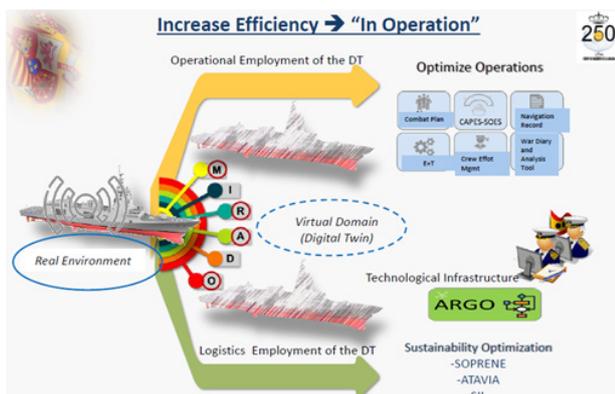
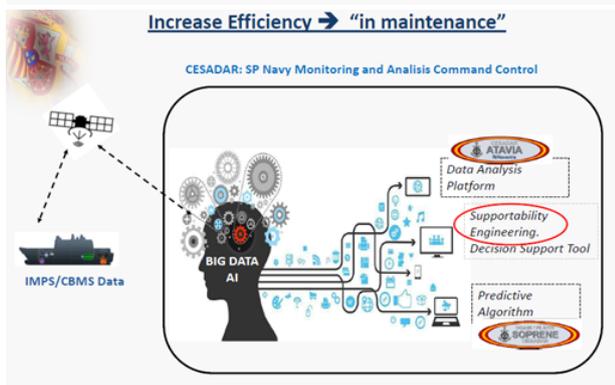
**Keynote Speaker: Vice Admiral Manuel Martinez,  
Director for Engineer and Naval Shipbuilding at Division de Planes del Estado Mayor de la Armada  
Title: New Challenges and Technologies for current and future Spain Navy Warships**

Effective military capabilities can take decades to research, develop, procure, field and integrate. But new threats can emerge with little warning. To address this imbalance, European militaries, and the European Defense Agency (EDA) must plan ahead to anticipate future capabilities needs and adapt to the fast pace of change in the technology and threat environments.

U.S. Government Accountability Office states four broad categories for emerging threats:

- Adversaries Political and Military Advancements
  - Chinese Global Expansion, Russian Global Expansion, Iranian Political and Military Developments, North Korean Military Developments
  - Foreign Government Capacity and Stability
  - Terrorism
  - New Alliances and Adversaries
- Dual-Use Technologies
  - Artificial Technologies
  - Quantum Information Science
  - Internet of Things
  - Autonomous and Unmanned Systems
  - Biotechnology
  - Other Emerging Technologies
- Weapons
  - Weapons of Mass Destruction
    - Electronic Warfare, Hypersonic Weapons, Counter-space Weapons, Undersea Weapons, Cyber Weapons
    - Missiles
    - Intelligence, Surveillance, and Reconnaissance Platforms
    - Aircraft
  - Event and Demographic Changes
    - Infectious Diseases
    - Climate Change
    - Internal and International Migration
- From Spain's Navy
- Several Enabling Technologies:
  - Artificial Intelligence, Quantum Computing, Nano Technology
  - Cloud Computing

- Unmanned Vehicles, Robotics
- New Battlefield
  - Cyber Space
  - Cognitive Space (IW)
  - Legitimate Battlefield
  - Public Opinion Battle Space
- New Weapons
  - Hypersonic Weapons
  - New Generation of Submarines
  - UXVs
  - Cyber Attacks
- New Framework – New Scenarios
  - No declared enemies
  - No governance
  - Open to
    - A variety of missions
    - Very Different Stakeholders
    - Disruptive Tech
    - Open information
- Technology is available to everyone
- Reduction of development cycle



**Spain Navy Project 4E**

4E is envisioned as block of “technological projects” to develop capabilities to be included in a number of different future European combat escorts which will be built by European Industry.

The three technological projects are:

- AAW Destroyer 7000T
- ASW Frigate 6000T
- Multipurpose Frigate 4000T

**Keynote Speaker: Brigadier General Davide Re Italian Air Force, NATO Strategic Direction – South (NSD-S) HUB Director**

**Title: Opportunities and threats from innovative and disruptive technologies: Shaping the future of security in the Maritime domain**

**NSD-S Hub Mission**

Be a Virtual Docking Station that shares comprehensive information sharing, anticipates threats and challenges (Horizon Scanning), and identifies opportunities in the assigned area of interest with a wide variety of International/Regional actors.

**NSD-S Hub Vision**

A focal point for NATO to interact and cooperate with relevant Actors, integrate the regional perspective into NATO mindset, and assist Partners to contribute to projecting security and stability.

Innovative technologies are necessary, because of the complexity of modern society fast evolving dynamics among which the growing dependence on technology and “internet of things”.

Just as a mere reference and example, 97% of internet traffic and \$10 trillion in daily financial transactions pass through 1.2 million km under-sea cables: this means that everyone of us may be affected and victim of potential cyber-crimes, also in remote locations.

How innovative disruptive technologies impact Africa and the Middle East

• Technological change has been even more transformative and disruptive for the global South than for Europe and North America.

• Waterways in the Middle East could easily become chokepoints and secure maritime domain maximizes the gains for Africa.

• Understanding technological innovation is necessary to secure the maritime environment.

**Dynamics of the Horn of Africa (HoA)**

• HoA hosts 1/3 of African population and attracts many Global Powers striving to control its natural resources and trade routes (10% of world global trades).

• International disputes, instability areas, unemployment and marginalization as promoters of VEOs and foreign ter-

rorist networks.

- Maritime security and thorough understanding of main drivers of instability is key to protect the routes crossing the Gulf of Aden and the Red Sea.
- International cooperation and dialogue to ensure Freedom of Navigation from Bab al Mandab to the Suez Canal.

### Energy Security

Recent history has shown how fundamental is the protection of Critical National Infrastructures in a wide array of evolving challenges and threats (e.g., weaponized drones, cyber-attacks, malwares, etc.)

- Attacks on Infrastructures & Routes:
  - Chokepoints (supply disruption)
  - Kinetic Attack (vulnerable targets)
  - Cyber Attack (increasing digitalization)
- Deniability Strategy:
  - Use of non-State Actors/Proxies
  - Cyber Domain Anonymity

NSD-S Conclusion:

Foster HUB network to better understand potential risks and possible opportunities with selected International/Regional Actors through mutual respect and with an African and Middle-Eastern point of view.

Focal point for NATO on different Areas of cooperation to enable support to Partners and to Non-NATO Partners in projecting security and stability.

Only a joint coordinated effort is key to enhance understanding of EDTs capabilities, while exploring viable solutions, possible applications and trustful cooperation to tackle together today and tomorrow's threats and challenges.

**Keynote Speaker: Rear Admiral Jean-Michel Martinet, Deputy Operation Commander of EUNAVFOR MED Operation "IRINI"**

**Title: European Naval Forces in the Mediterranean - Operation IRINI**

Core Task: Countering Illicit Arms Trafficking (CIAT)

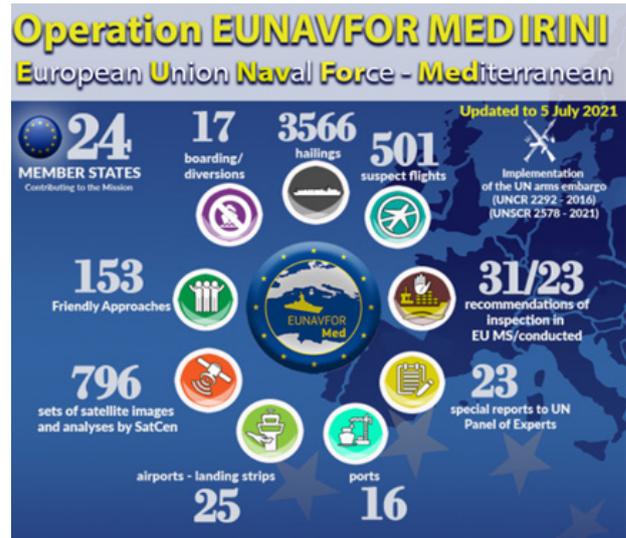
UN Security Council Resolutions:

- UNSCR 1970 (2011) – Establishing the Arms embargo
- UNSCR 2292 (2016) – Authorizing boardings and diversions
- UNSCR 2578 (2021) – Extending UNSCR 2292 mandate up to 3 June 2022

Secondary Tasks:

- Gathering Information Oil Smuggling: UNSCR 2146 (2014), UNSCR 2362 (2017), UNSCR 2509 (2020), UNSCR 2571 (2021),
- Contribution to the Human Smugglers Business Model disruption
- Training and Monitoring LCG & N

### Summary of CIAT & GIOS Results



### Lecture: EU Coordinated Maritime Presences:

Where do we stand and what's next

**Captain (Navy) Stathis KYRIAKIDIS (EL N), Head of Division OPS Coordination, European Union Military Staff, Deputy Director of the EU Maritime Area of Interest Coordination Cell (MAICC)**

EU Coordinated Maritime Presences Concept:

- It is complementary to the EU Maritime Security Operations
- It creates new opportunities to enhance EU presence beyond the ongoing CSDP operations
- It maximum benefits from the EU M-S' naval presences around the globe
- It does not affect the EU's ability to launch a CSDP Operation
- The military assets remain under national OPCON

The role of the EU CMP Maritime Area of Interest Coordination Cell (MAICC):

- It collects situational awareness information based – mainly - on the parent OHQs' reports and open sources
- It analyses and disseminates strategic assessments, within the EU M-S
- It establishes relations with maritime partners
- It is not a Maritime Operations Centre (no shift rotation)

### Lecture: Dilemmas of Deterrence in an Era of Emerging Destructive Technologies

**Professor James Henry Bergeron, Political Advisor to the Commander Allied Maritime Command**

Does Emerging Destructive Technologies undermine or stabilize our ability of deterrence? Some scholars see Emerging Destructive Technologies as stabilizing while others view it as destabilizing.

Three things to consider when using deterrence:

- Mutual sphere of activity
- Requires knowledge of adversary capabilities
- Requires specific parameters of time

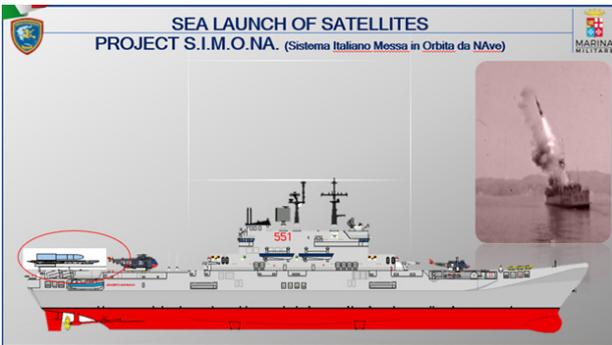
**Lecture: Innovation technologies in the Italian Navy – the future combat naval system in the 2035 multi-domain operation**

**Captain Marco Casapieri, Chief of Space Section of the Italian Navy General Staff**

Starting from 2020, ITN created the Technological Innovation Network, led by the General Staff, which connects all the Technical Centers of the Navy and oversees the ITN main technological areas of interest in which it is strategic to achieve/maintain a competitive advantage (underwater, AI, Quantum, Robotics, Autonomy, sensors and weapons against the hyper-sonic threat, air-independent energy sources and technologies related to space domain).

The Future Combat Naval System 2035 project is based on macro capabilities drawn from these technological areas of interest, encompassed in a specific operational framework.

The FCNS35 macro capabilities are declined by the operational environments (Surface, Underwater, Air, Littoral, Space) or identified by their transversal effects (Unmanned Systems, Multi Domain C2, Enhanced Maritime Situational Awareness, Harbour and critical infrastructure protection, Key Enablers).



**Lecture: Modern technological threats from a ship-owner's perspective**

**Dr. George Pateras, Hellenic Shipping Chamber**

Technological challenges in the maritime industry

- Communication/"Big Data Transfer". Developing the effective means to pass info to the end user.
- Detection of GPS navigation system jamming attempts.
- Creating backups for cyber attack cases.
- Variations on how necessary autonomous ships are and whether they are worth the risks.
- Insurance exclusions for computer viruses.

Despite the negative applications that may disrupt seaway trade, innovative technologies are a must for the, environmentally friendly, development of the supply chain.

**Lecture: Commercial and military use of unmanned/ autonomous vehicles in the light of hybrid threat**  
**Commander Georgios Giannoulis, Hybrid Center of Excellence**

There are 4 degrees of autonomy

- Ships with automated processes and decision support.
- Manned but remotely controlled ships.
- Unmanned and remotely controlled ships.
- Fully autonomous ships.

Advantages of Unmanned/ Autonomous Marine Vehicles

- Operating for prolonged period of time without burdening and endangering crew personnel.
- Can support various missions, ranging from recreational and commercial uses to those of militaries
- Minimize operational costs for shipping companies (increased cargo capacity due to absence of accommodation spaces, decrease of fuel consumption by incorporating green power, savings from crew salaries)
- Military applications
  - minimize the casualties in case of war conflict
  - Force multiplier in the battlefield,
  - Perform different types of operations (ISR, AAW, ASW, ASuW),
  - Operate without any limitations in NBC environment.
  - Offer high level of stealth characteristics and difficulties in attribution, key ingredient for hybrid campaign
  - Are ideal for a hybrid actor in controlling the escalation level in low-intense conflicts

Challenges of Unmanned/ Autonomous Marine Vehicles

- Outdated or missing regulatory framework
- Possible absence of human decision-making process
- Vulnerable to cyber attacks
- Congested information to be processed from multiple sensors can lead to serious failure

**Lecture: Windward's Predictive Intelligence Platform. A maritime AI platform to manage all maritime domain awareness and intelligence needs.**

**Mr. Dror Salzman, Windward Intelligence Research Manager**

Deceptive Shipping Practices:

- AIS Handshake
- Global Navigation System Manipulation

Windward supports operational missions and intelligence analysis with Maritime AI to critical organizations.

- Maritime Intelligence
- Law Enforcement
- Defense

**Lecture: EU-NATO Cooperation in Maritime Situational Awareness: Advancements and Limitations**  
**Mr. Joao Almeida Silveira, Independent Policy Analyst, Research at Portuguese Institute of International Relations (IPRI)**

Maritime Situational Awareness (MSA) is an essential maritime security task. The task has become more challenging in the last decades because of the global proliferation and intensification of activities, actors, and interests at sea.

Aware of the challenge, the EU and NATO have been developing efforts in streamlining institutional responses, as well as in improving doctrines and instruments to enhance MSA. The efforts included autonomous actions, as well as activities within the framework of their strategic partnership, particularly after the Warsaw Summit of 2016. At Warsaw, within a broader movement to deepen their strategic partnership, the EU and NATO committed to the improvement of interinstitutional cooperation in several areas linked with MSA, including in coordination, information sharing, and lessons learned<sup>6</sup>.

MSA is a process that blends civilian and military as well as public and private inputs to achieve an accurate picture of the maritime domain.

As a process MSA involves four main interconnected and indissociable elements:

**Surveillance and Data Collection**

- Maritime Surveillance
- Data Collection
- Regulatory Initiatives

**Data Fusion and Knowledge Development**

- Data Fusion & Data Sharing
- Analysis & Knowledge development

**Coordination and Knowledge Dissemination**

- Information sharing & Communication Systems
- Command & Control

**Management and Improvement of MSA Structures**

- Technology Development
- Education & Training
- Lessons Learned
- Capacity Building

The empirical evidence contained in the MSA literature indicate that after the Warsaw Summit, the cooperation between the EU and NATO advanced mostly through ad hoc and sectoral activities. Informal, but sanctioned, staff-

to-staff exchanges were the main mechanism in the advancement of EU-NATO relations, albeit relevant structural initiatives such as the establishment of the CoE Hybrid. Informal, ad hoc, and sectoral initiatives are positive, yet they should be regarded as steps towards a structured and comprehensive relation, where informality and ad hoc solution plays a role, but not a central one. Thereby, the full potential of EU-NATO cooperation remains to be unleashed.

**Lecture: A Simulation of Training Platform for Unmanned Surface Vehicles**

**Dr. Chrissavgi Dre, Deputy Director New Technologies, Intracom Defence**

**Dr. Ioannis Dages, Senior Engineer, Intracom Defence**

**Intracom Defence Situational Awareness**

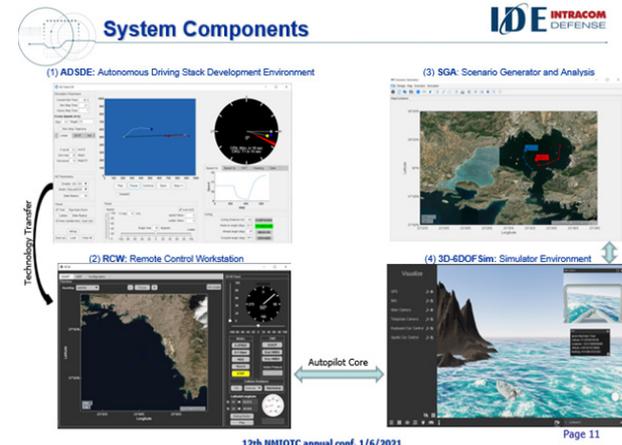
- Unmanned Surface Vehicles (USVs) will be a key component of naval operations in the future, especially for countries like Greece.
- Modern USVs demonstrate high performance, autonomy, robustness, reliability, data/communications, interoperability, mission versatility. Furthermore, they are designed for safety, easy deployment, operation and maintenance.
- Simulation and training platforms can play a key role in the design of robust sea vehicles as they reduce time and cost for design testing and sea-trials.
- A novel simulation and training platform for the design of Unmanned Surface Vehicles is presented.

**Products**

- Communication Systems
- Missile Applications
- Security Solutions
- Unmanned Systems
- Hybrid Power Systems

**System Components**

- Autonomous Driving Stack Development Environment
- Remote Control Workstation
- Scenario Generator and Analysis
- 3D-6DOF Sim: Simulator Environment



Future Plans

- Explore various open-source stacks (e.g. MOOS IvP, Apollo, Autodrive) and build a complete USV AD stack
- Extend the Scenario Generator with C2 functionalities
- Extend the LGSVL to support high fidelity (near real-time) communication links and jammers
- Explore the adoption of HLA to be able to join Federate Distributed Simulations

**Lecture: Arming Autonomous Vessels**  
**Mr. Matthew Searle, CTO Maritime Arresting Technologies**

Choice of Weapons:

- Kinetic
  - Surface: Direct fire, small missiles, kamikaze UXVs
  - Sub-surface: Energetic, Super cav. , armed UUVs / torpedoes.
- Non-Kinetic (Non-Lethal) weapons
  - Dazzling lasers
  - 95Ghz microwaves
  - Pulsed energy
  - Plasma balls
  - Drogue lines
  - Nets
  - MVSOT occlusion technologies

Politics and Ethics: Any use of kinetic weapons in foreign or domestic port will have political consequences. If used against misidentified innocent victims will cause significant moral and ethical issues.

Arming AXVs with non-kinetic effectors allows instant response

- Electric power allows instant launch
- No need for crew to scramble
- Small size and low cost allow multiple units to be fielded
- Use of non-lethal / non-kinetic effectors allows low level launch authorization

Non-lethal weapons add capability to the kill chain

- Non-kinetic effectors act like a spider’s web
- Buys time for manned units to arrive
- Captured target allows more time for kinetic response if needed

Stingray Interceptor C-UUV Net

- The fully automated Stingray interceptor net is a non-kinetic system that can be deployed against any potential threat without risk to persons or property.
- The Stingray net is deployed across the path of the incoming underwater threat at up to 20 knots, taking less than 10 seconds to set.
- Forms an invisible barrier from sea surface to seabed.

- The underwater threat collides with the net and becomes entangled.
- The captured threat is towed out of harm’s way.

**Lecture: Unmanned Aerial System for Maritime Domain Awareness (MDA) – A Ship Captain’s Perspective**

**Mr. Mark A. Russell, Director, International Business Development of Martin UAV**

Maritime Domain Awareness is the effective understanding of anything associated with the maritime domain that could impact the security, safety, economy, or environment. The maritime domain is defined as all areas and things related to the sea, ocean, or other waterways, including all maritime-related activities, infrastructure, people, cargo, ships, and other vehicles.

What information can UAS give the captain, today?

- Cameras
  - EO “Super Zoom”, EO/IR, Laser Marker/Pointer
  - Laser Target Designator, AI, Processing, HD Imagery
- AIS (Automatic Identification System)
  - UAS extend AIS 200-300km+
- Wide Area Surveillance “ViDAR”
  - Helicopter – using EO/IR, needed 30 mins to locate man in water (sea state 2), in 4km x 4 km area.
  - Kestrel – only 90 secs
- Synthetic Aperture Radar (SAR)
  - All Weather Radar, Day/Night, Maritime & Land
- Communications & Video Relay
  - Extended Range, MANET, VOIP/ROIP, Video, C2

The VBAT is a VTOL system designed specifically for maritime (small ships) and does not have a launcher or recovery unit. No equipment on the deck. It can deliver the MDA capabilities and take off/land in a 3m x 3m space on the ship, operating out to 150km from the ship, day and night. This capability was not possible 2 years ago. The VBAT is operational now with US and Allied forces.

**Lecture: A review on current Maritime Threats Scenery and operational challenges outlining needs and cost-effective solutions of technology**

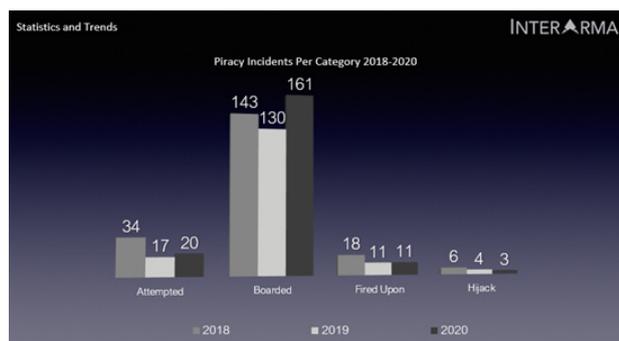
**Mr. Alexandros Lyginos, CEO of Interarma Ltd**

For the past 3 years, we observe a slight fluctuation in the total number of piracy incidents occurred worldwide, whilst almost half of them are reported in West Africa waters. This fact shows the instability in Political, Social and Economic Environment remains within the subject regions.

Piracy Per Year

- 2018: 201
- 2019: 162

• 2020: 195



### New Technologies Preventing Piracy

- Artificial Intelligence (AI) has made headway to enhance maritime safety, optimize business operations and processes, and aid in voyage planning and vessel maintenance.
- The use of AI-based systems to create fully automated piracy alerts can allow seafarers a few moments to react, potentially saving lives.
- In cracking down on maritime piracy, one must first understand how pirates operate and make their advances. Behavioral analytics, a new holistic interpretation of raw empirical data, can dramatically enhance the crew's situational awareness by monitoring data and motion within the vicinity of a vessel in detail.
- This information includes identifying the number of boats and other neighboring ships within the same waters, the routes and speeds it crosses paths to determine distinct patterns, unknown correlation and provide clarity to ambiguities.

### June 2, 2021 – NMIOTC Keynote Speeches

**Keynote Speaker: Rear Admiral Kiril Mihaylov**  
**Commander of the Bulgarian Navy**  
**Title: Implications of Disruptive Technologies for Smaller Navies**

Identifying disruptive technologies and their use in the military domain early is vital to achieving superiority on the battlefield. Countries with small navies are not usually expected to lead the way to technological breakthroughs and innovations, since this endeavor involves a lot of resources and financial commitments. But making sure to observe closely the trends in the naval community and implementing such innovations would yield surprising results. Synergizing the military and civil industries can lead to a fundamental change in operational technologies and strategies and only through working together can we exploit the opportunities that disruptive technologies provide. Furthermore cooperation and collaboration between entities, such as NATO and EU for example, would pave the

way to better understanding how those existing technological achievements may be utilized in a principal way of advancement in different military domains.

**Keynote Speaker: Rear Admiral Mihai Panait**  
**Chief of the Romanian Naval Forces**  
**Title: Emergent, Innovative and Disruptive Technologies – Opportunity or Threat?**

### Future Emergent and Disruptive Technologies

- Big Data and Advanced Analytics
- Artificial Intelligence
- Autonomy Materials
- Space
- Hypersonic

### Maritime Implementation of Emergent and Disruptive Technologies I

- Artificial Intelligence – drones communicate with each other to work as a group using AI operators can control the entire swarm at once
- Opportunity – cheap or less expensive drones
- Threats – swarms of drones for anti-ship warfare launched by commercial vessels, give the adversary the benefit of plausible deniability used for ISR missions or as loitering munitions

### Maritime Implementation of Emergent and Disruptive Technologies II

- Big Data Advanced Analytics (BDAA)
  - OSINT enthusiasts routinely post pictures on social media covering naval vessels positions and activities
  - Source of pictures is free or inexpensive imagery from commercial satellites
  - Huge amount of data available and info on maritime assets
- Opportunity – can augment own maritime domain awareness
- Threat – can have an impact on operations states with underdeveloped ISR assets or non-state actors could potentially pay for such pictures in an effort to plan an attack

### Maritime Implementation of Emergent and Disruptive Technologies III

- Novel materials and manufacturing
- Opportunity – Increased performance (speed, distance, effects etc.)
- Threat – Arms race and losing technological advantage

**Keynote Speaker: Major General Alaa Abdulla Seyadee**  
**Commander of Bahrain Coast Guard**  
**Title: Maritime Domain – An Approach to Information Sharing and Management**

### Strategic Approach

Bahrain coastal surveillance system was designed and installed of multiple integrated coastal surveillance sensors to provide the Coast Guard with a comprehensive maritime situational awareness and Command and Control capability. Includes establishing maritime surveillance sensor sites and a state-of-the-art Regional Command Center. Fused sensors include X and S-Band surface search radar, Infrared Electro-Optical long-range cameras and AIS base stations.

### Strategic Approach Phases

- Phase 1 = Technology & Partner Evaluation
- Phase 2 = System planning and product selection
- Phase 3 = Base Line AIS system
- Phase 4 = System Enhancements

### Vessel Identification Transceivers

Customized transceivers issued and securely installed on every vessel. Full vessel and operator details captured electronically at point of installation.

### Command and Control

National maritime data center. Ergonomic command and control center with state-of-the-art visualization technologies and automatic data analysis and incident management.

### Data Utilization and Information Sharing

Real time coverage across entire gulf. A total of 50 million position reports every week processed and correlated in real time.

### The Future

- Integrate new sensor systems
- Enhance data analytics
- Refine command and control

**Keynote Speaker: Brigadier General Bart Laurent  
Director of the Operations of the European Union  
Military Staff**

**Title: Future of Security in the Maritime Security**

The key elements to develop the EU future strategies, especially in the global maritime environment are resilience and capabilities development along with emerging disruptive technologies.

Resilience to adapt our structures, processes, our hard- and software is needed, as 'events' may dictate and foresight should indicate. The use of, and protection against, remotely operated vehicles of different sorts is just one of the 'events' that show how relatively small technological developments may bring about big changes in military actions.

Emerging Disruptive technologies, ranging from Artificial Intelligence (AI) and quantum technologies to hypersonic weapons and new space technologies have a serious potential to revolutionize our military capabilities, strategies and operations. The EU has a strong potential in EDTs, indicated by a vibrant industry and start-up landscape in fields such as AI and robotics, but for sure, more effort is needed to match the level of development in this field of our partners and competitors.

In November 2020, as a kick-off for the work on the Strategic Compass (SC), the EU has originated its first intelligence based comprehensive, 360-degree analysis of the full range of threats and challenges the EU currently faces or might face in the near future. In the analysis, the risk for the EU not being prepared to react to the new threats and challenges was mentioned. Building on the threat analysis and other possible thematic input, the EU will define policy orientations and specific goals and objectives in four baskets:

- Crisis Management
- Resilience
- Capability development
- Partnerships

**Lecture: Maritime security and smart technologies:  
Turning the attention to Africa**

**Professor Francois Vrey, PhD Research Coordinator  
Security Institute for Governance and Leadership in  
Africa- SIGLA**

**Captain Mark Blaine, Stellenbosch University, South  
Africa**

Maritime security and smart technologies: Turning the attention to Africa

The information below is directly from

<https://howafrica.com/the-top-10-most-powerful-navy-in-africa/> :

“A ‘Blue Water Navy’ is a navy that has the ability to perform all aspect of naval operations. They can travel, navigate, and support naval operations deep in the ocean. A navy with Blue Water capabilities has the support systems and infrastructure to travel unhindered to a part of the world’s waters.

- Examples of Blue Water Navy in Africa:
  - Egyptian Navy
  - Algerian National Navy
  - South African Navy

A Navy can be called ‘Green Water Navy’, if it has the ability to project its naval operations far beyond it shores but is still limited in its deep ocean operations. A Green Water Navy can travel and navigate long distance but can only do so in a limited time due to its lack of deep water opera-

tions support infrastructures and platform

- Examples of Green Water Navy in Africa:
  - Nigerian Navy
  - Moroccan Navy
  - Tunisian Navy
  - Equatorial Guinea Navy

The Brown Water Navy is a navy primarily focused on littoral warfare. They usually excel in 'swarm attacks' using numerous small boats to overwhelm an opponent. The major type of ships Brown Water Navies possesses are mainly small gunboats and patrol ships.

The primary role includes maritime patrol, combating sea criminals, coasts guard duties, harassing enemy forces, and mine sweeping and clearing.

- Examples of Brown Water Navy in Africa:
  - Angolan Navy
  - Tanzania Navy
  - Sudanese Navy
  - Ghanaian Navy
  - Kenyan Navy
  - Namibia Navy
  - Cameroonian Navy

A Constabulary Corp possess no credible deterrence platforms neither do they have any warfighting capabilities or skills. Its main role is to safeguard the seaports and harbors from criminals and other vices.

- Examples of Constabulary Corp
  - Libyan Navy
  - Togolese Navy
  - Senegal Navy
  - Mauritius Navy
  - Eritrea Navy
  - Gabon Navy

There are many African countries that are landlocked that do not own or operate a navy."

The Way Forward for Maritime Security Capacity Building

- Material
  - Equipment and Infrastructure
- Human Capacity Building
  - Training Courses & Education
  - Mentoring
  - Workshops & Tabletop Exercises
- Institutional
  - Strengthening organizational structures
  - Law Making

**Lecture: Maritime security, smart technologies and the law: An African perspective**  
**Dr. Michelle NEL, Facility of Military Science, Stellenbosch University, South Africa**

There is a concern with regard to the use of technology in Africa from a HUMAN RIGHTS perspective. Science and its offspring technology have been used in this century as brutal instruments of oppression.

African Maritime Legal Framework

- Domestic Law
- United Nations Convention on the Law of the Sea (UNCLOS)
- Co-operation agreements
- 2050 Africa's Integrated Maritime Strategy
- International humanitarian law
- International human rights law

**Lecture: Beyond the Responsibility Gaps in the Use of Autonomous Weapons**

**Mr. George Kiourktsoglou, Greenwich University**

The use of autonomous weapons can be dangerous and hinder government relations globally. This statement leads to ethics being major factor when discussing the use of autonomous weapons.

A New Ethical Framework within a Democratic Political Context

The following issues must be addressed when discussing the ETHICs of the use of autonomous weapons

- No Human Agency
- No Vectoral (causal) Attribution
- No Universal Legal Uniformity
- Split between high- and low-tech militaries

**Lecture: 3D Printing Security Issues**

**Dr. Nikitas Nikitakos, Professor, Dept. of Shipping Trade and Transport, University of the Aegean**

Additive Manufacturing is the process of joining materials to make objects from 3D model data, usually layer upon layer, as opposed to subtractive manufacturing methodologies. On an Additive Manufacturing printer, costs are roughly the same for producing complex objects and simple ones. Fabricating an ornate and complicated shape does not require more time, skill, or cost than printing a simple block, once the digital design is completed. The industry will undoubtedly continue to develop worldwide over the next few decades, and the abilities of the printers will be vastly different than they are today in ways that are not completely predictable.

The Additive Manufacturing Framework

Capital versus scale: Considerations of minimum efficient scale can shape supply chains. AM has the potential to reduce the capital required to reach minimum efficient scale for production thus lowering the manufacturing barriers to entry for a given location.

Capital versus scope: Economies of scope influence how

and what products can be made. The flexibility of AM facilitates an increase in the variety of products a unit of capital can produce, which can reduce the costs associated with production changeovers and customization and, thus, the overall amount of required capital.

**Additive Manufacturing and Future Security Threats**

- Weapons Proliferation
  - VEOs (Violent Extremist Organizations) represent some of today's greatest security threats, and they are only going to be even more dangerous with the proliferation of AM.
  - Homemade weapons
  - Advanced technology weapons
  - Chemical, Biological, Radiological, Nuclear, and Explosive (CBRNE)
- Drugs
- Miniature explosive drones



- Part of weapons systems



Additive Manufacturing is occurring but we need to consider government policy, law, and ethics.

**Lecture: The Role of Emerging and Disruptive Space Technologies in Maritime Information Warfare**  
**Ms. Lucy Lim, NATO Office of the Chief Scientist, NATO Science & Technology Organization**

Emerging and Disruptive Technologies  
 The EDTs will be increasingly intelligent, interconnected,

distributed, and digital.

These technology trends will drive four key military capability trends:

- Ubiquitous Sensors and Autonomous Systems
- Increased importance of Battle Networks
- Expanding Operational Domains
- Increased reliance on Precision Warfare

**Maritime Domain Awareness**

• Space technologies are vital to Maritime Domain Awareness because of:

- The expeditionary requirements of naval operations
- Global maritime security architectures
- Ability to track and identify vessels of interest
- Sensors
  - Quantum sensors
  - Unprecedented detection
  - Smaller vessels
- Nano Satellites
  - Expand area coverage
  - Cost effective
  - Reduce revisit times and data downlink latency

• Synergies

- Combination of space technologies and new analytical methods
- Increase speed and efficiency of analysis

**Position, Navigation and Timing**

- Global Navigation Satellite Systems (GNSS) support:
  - Electronic Chart Display and Information System
  - Automatic Identification System
  - Automatic Track Control
- Quantum
  - Precise gravity gradient measures
  - Mobile platforms
- Artificial Intelligence
  - Detection of spoofed signals
  - Integration of multiple sensor modalities

Networks are the physical foundation of the information battlespace.

In MIW, SATCOM plays an integral part in delivering networked capabilities.

• SATCOM is limited:

- Cost of launching satellites
- Stabilizers needed for on-board antennas
- Relatively low bandwidth incapable of supporting applications requiring high data rates
- High-throughput Satellites
  - Take advantage of frequency reuse
  - Support high bandwidth applications
- Artificial Intelligence
  - Space-Air-Ground integration
  - Interference management

- Beam Hopping
- Quantum Comms
- Info transmission across 'turbulent' water
- Secure comms

**Conclusion**

Space technologies will play a central role in warfare defined by achieving narrative dominance. The latest innovations in space-based capabilities will be essential aspect of future Maritime Information Warfare systems. Scenario-based testing will further enhance NATO's understanding of the value of space technologies and intersections with Emerging Disruptive Technology's in operations.

**Lecture: Emerging and Disruptive Technologies: EDA efforts in the field**  
**Dr. Georgi Georgiev, Project Officer Maritime Capabilities Support, CAP, EDA**

EU Global Strategy is vital for European security. Active work on EDT essential for European strategy autonomy

European Defense Agency (EDA) efforts are based on three different perspectives

- Technological
- Operational
- Industrial

EDA efforts for research, technology, and innovation

- Post-quantum cryptographic algorithms
- AI C2 Systems for cyber
- Disruptive fuel: Hydrogen technologies for military operations
- Energy storage for high energy demand applications
- AI based technologies combined with big data
- Quantum information networks
- Internet of things for defence
- Muscular, brain and cognitive UI (MUSCIUS)
- Hybrid multifunctional metamaterials
- EMRG and hypervelocity projectile
- AI based multi-sensor seeker head
- Swarms, swarming and multi-robot cooperative systems

**Lecture: AI opportunities, requirements, and barriers for adoption of AI in maritime use cases**

**Mr. Darek Saunders, Head of Border Security Research Observatory AI Research and Innovation Unit Capacity Building Division**



FRONTEX EUROPEAN BORDER AND COAST GUARD AGENCY  
 2020 in brief: <https://frontex.europa.eu/publications/2020-in-brief-1rbEDG>

Representative use cases for the application of Artificial Intelligence solutions in Border Management.

- Automated Border Control
- Surveillance Towers
- UAS
- Maritime Domain Awareness
- Object Recognition
- Robotic Systems
- Machine Learning Optimization
- Predictive Asset Maintenance
- Geospatial data Analytics

Expected future Artificial Intelligence Maritime Domain Awareness Capabilities

- Main operational response trigger
- Identify and assess abnormal behavior
- Identify new threats
- Integration of ad-hoc data sources

**Lecture: ARSx2: A marine area surveillance system using UAS, assisting anti-privacy measures and contributing to hostages and/or vessels recovery**  
**Mr. Evan Christodoulou, CEO of A. S. Prote Maritime**

A. S. Prote Maritime Ltd was founded in 2013 in Cyprus with the sole purpose of providing armed and unarmed security services to merchant ships, against piracy. From 2017 our activities have expanded to the use of new digital technologies in merchant shipping, the maritime environment and relevant market.

Reasoning of using UAVs against piracy

- The need to improve existing measures to encounter piracy and provide other non-military options.
- Almost all previous attempts to assist in the fight against piracy by using UAVs:
  - remained only at a theoretical level and never developed
  - were of a purely military nature
  - were completely failed private efforts, poorly organized and staffed with inappropriate personnel, based on the naïve idea that "anyone can fly a UAV"

The Project ARSx2

The innovative project ARSx2 deals with the development of a maritime surveillance system, consisting of two UAVs, for the prevention of piracy or other illegal activities, as well as the monitoring of pirate incidents in progress, and search and rescue cases at sea.

- Phorcys
  - The first UAV, called “Phorcys”, is a small and flexible VTOL hexacopter on a Y6 configuration. Its compact and stocky structure enables it to operate in tropical weather environments. Equipped with a powerful hybrid EO/IR stabilized camera with object tracking capabilities, humans, and items such as guns, canisters, etc. can be identified from a safe distance. Phorcys will act as the “long arm” of the private guards and/or the crew aboard merchant ships.
- Ceto
  - The second, easy to use by non-specialists fixed-wing UAV, called “Ceto”, is used in emergency cases as a “rescue beacon”. It is deployed when a vessel is already or will be occupied by pirates, while real-time position, images or video are transmitted to the patrolling authorities and rescue organizations. Its purpose is, either to follow the vessel captured by the pirates or the ship of the pirates with hostages, during ongoing piracy action by transmitting at appropriate frequencies emergency signals as well as critical information, such as images etc.

#### ARSx2 System Advantages

- Increased maritime surveillance ability
- Early warning of potential pirate threats
- Capture, process and analysis of data
- Real-time high precision intelligence to control stations and rescue authorities
- Remote operation with mission management and autonomous commands
- Reliable network protocols for fast, safe and robust data transmission
- Assistance to search and rescue operations
- Monitoring of a pirate attack or hostage situation
- Recognition and monitoring of marine hazards
- Alleviation of risk of injury or death of humans during or after a pirate attack
- Reduced insurance costs for crews, ships, and freights
- Reduced economic loss of countries adjacent to high-risk areas
- Optimization of ship routes
- Fuel saving
- Ship rental time saving
- Security of the movement of humans and goods

#### Lecture: Security Challenges in 2030: The Challenge of Reality vs Unreality

**Mr. Christopher Kremidas-Courtney, Senior Fellow, Friends of Europe; Lecturer Institute for Security Governance (ISG); Lecturer, Geneva Center for Security Policy**

#### The World by 2030

- Democracy versus Authoritarianism
- Women will own 55% of the world’s wealth
- Over 7.5 billion internet users by 2030
- Cybercrime will be \$10.5 Trillion by 2025
- Next Industrial revolution: Sub-Saharan Africa
- Most populous country: India, Largest economy: China
- India’s economy larger than Germany or Japan
- Increasing impact of climate change
- Major economic shifts as a result of all above
- Reality versus Unreality: by choice (recreation) and due to disinformation
  - Augmented Reality (AR) is a live direct or indirect view of a physical, real-world environment whose elements are augmented by computer-generated sensory. i.e. Augmented Reality Glasses
    - Emergence of improved affordable wearable devices such as AR glasses in 2023 - will begin to replace mobile phones
    - Virtual Reality (VR) is a simulated experience that be similar to the real world.
    - Numerous positive applications for military training, mental health, recreation, enabling handicapped and elderly, travel business, education, medical, communications
    - VR enables an immersive experience – future developments include the ability to plug directly into human nervous system
    - AR and VR Implications for Security
      - Espionage: recruiting of sources & subsequent activities in VR metaverse
      - Hacking of AR systems to spoof navigational use by public and private actors
      - Disinformation: More precise and potent delivery means via AR and VR and AI-enabled bots
      - Deeper societal divisions due to an emerging split based on competing forms of reality
      - Disinformation-Driven Violence 2020-21
        - Attacks on 5G towers – over 200 in Europe alone
        - Various Qanon attacks to include train derailments, attack on Canadian PM residence, etc
        - Attacks on vaccine centers
        - August 2020 attempted storming of Bundestag (German Federal Parliament)
        - January 6, 2021 attack on U.S. Capitol
    - How to be prepared for AR/VR?
      - Regulate and build safeguard into security of AR and VR

## Lecture: SYNORIS – The “Chariot” of Modern Maritime Warfare

Mr. Evangelos Mantas, DevSecOps Engineer at Infil Technologies

### Why Use Unmanned Underwater Vehicles (UUV)

- UUVs are far less expensive to operate and maintain than manned platforms.
- Enhanced payload is able to maintain constant awareness and long-range coverage of the field. Extended surveillance periods and data collection, enables a better understanding of long-term behavior patterns and trends.
- Improved range coverage, as they allow manned platforms to pursue tasks elsewhere.
- UUVs keep human personnel and expensive equipment away from danger.

Unmanned Underwater Vehicles are used for:

- Marine Exploration
- Wreckage Discovery
- Research
- Search and Rescue
- Technology advancement enable them to conduct autonomous and more complex mission scenarios

The latest UUV capabilities include the detection of submarines, such the Synoris UUV platform, providing an easily deployable solution to assist and enhance the situational awareness of the underwater battlefield in littoral and open seas environments, using hydrophones as passive sonars to discover hostile vessels otherwise undetected by traditional detection equipment. The envisioned network of autonomous UUV can cover a greater area, providing real and near-real time feed of the “underwater traffic”.

## Lecture: Threats and Operational Advantages of UAS in maritime and coastal environments

Dr. Christos Skliros, Head of Engineering, Hellenic Drones

Threats to the maritime and coastal environment

- Interference
- Intelligence, Surveillance, and Reconnaissance (ISR)
- Weaponization



3D-printing drones can easily be turned into deadly weapons.  
 "You can 3D-print 100 drones for about \$30,000 or \$40,000.  
 "It's really easy to arm these drones - you go to Walmart, you buy a bullet, you put the bullet in and you can shoot it pretty easily.  
 "There's also software out there that you can download onto your iPhone that lets you control 100 drones flying at once, which means you can have army drone swarms. So you could send that, for example, to a football field and cause a terror attack."  
 www.mirror.co.uk

Commercial Small Unmanned Aircraft System (sUAS) can significantly help fight against malicious drone attacks.

### Drone Detection Technologies

Radar technology can provide the effective detection of drones within an area, even able to detect long range It can be successfully paired with other technologies, such as RF or optic to provide thorough coverage if desired

- Pros
  - Longer range and constant coverage. Provides multiple drone detection and tracking
- Cons
  - It can be severely affected by nearby RF pollution Blind Sectors Requires authorizations from local authorities and experiences difficulties in detecting small drones. No pilot localization

Radio frequency analyses the RF spectrum within the protected area, searching for any form of communication between the drone and its remote control RF can even identify the drone make and model

- Pros
  - Features like drone and pilot localization as well as drone characterization It provides passive technology and multiple drone detection
- Cons
  - It does not detect autonomous drones Likewise, local RF pollution may also reduce effectiveness

Optic cameras allow visual direction and identification of approaching drones and their payloads Acting like a radar, optics may also be successfully combined with RF technology in providing thorough coverage

- Pros
  - The visuals can be retained and used for forensic evidence of drone intrusions It has passive technology
- Cons
  - Without the RF or radar back up, false alarm rates are often high Blind Sectors The performance is often impacted by light or weather conditions which usually results in difficulties detecting smaller drones nearby No pilot localization

Acoustic sensors are best in recognizing drone sounds from a database of drone acoustic

### Signatures

- Pros
  - It can detect autonomous drones while providing azimuthal information on incoming drone direction
- Cons
  - The sound database must be updated in persistent to be effective Drones today are also becoming more and more

soundless as technology advances. Encounters difficulties tracking modified drones. No pilot localization.

**Technologies for Drone Neutralization**

Jamming, allow safe return to home drone while safeguarding the point of interest

- Pros
  - No collateral damages from intercepting drone (fall in urban areas, crowded ports, refineries etc.
- Cons
  - It does not defeat autonomous drones with the exemption of systems with GPS jamming capacity. It can interfere the ambient communications Requires authorizations from local authorities.

Mitigation (wi fi spectrum restriction), allow safe return to home drone while safeguarding the point of interest

- Pros
  - No collateral damages from intercepting drone (fall in urban areas, crowded ports, refineries etc. No authorizations from local authorities.
- Cons
  - It does not defeat autonomous drones It can interfere the ambient communications

**Selecting The Best C-UAS Solution**

How to choose the best anti drone solution that provides the best optimal airspace security at the best cost and efficiency ratio while serving you in the longest time possible?

**Checklist: About the Technology**

- The ‘Modular’ –Is the technology scalable up and down

to better fit profiles on your site?

- Upgrades –Is it a good long-term investment? Could it be easily updated to stay one step ahead of other drones’ evolution without the risk of replacing everything?
- Durability –Is the technology durable enough to withstand different weather situations?
- Easy Installation and Integration –Is the technology easy to use and requires minimal training? Does it include an easy-to-use interface?
- Costs of Operation –How much is the cost to run the technology? Will it consume a big amount of electricity? Does it require dedicated staff to operate the system?
- Reactive/Accuracy –What is the technology’s way of detecting false alarm rates? How quickly can it detect drones within its area of coverage?
- Pilot/Localization –Is the technology able to locate the pilot and the drone which in turn will give you the options to apprehend the person behind the intrusion?
- Effectiveness (Even against multiple drones) –There are bigger security threats against drone swarms.
- Interference/Obstruction –Authorities may be extremely sensitive about the ‘frequency pollution’. Does the provider’s technology provide low interference or even passive?
- Reasonable Price and High Quality –Protecting your airspace is considered as an investment but it doesn’t mean breaking your bank. Does your provider offer a fair cost to quality ratio?

**CLOSING REMARKS**

With eight keynote speakers and 24 powerful lectures from established maritime security experts and academic professionals, this conference successfully addressed and discussed emerging disruptive technologies to significantly improve maritime security.



# Gender Perspectives in Maritime Security Seminar Report

The “Gender Perspectives in Maritime Security” Seminar was held virtually on June 3-4, 2021 at the NMIOTC in Souda Bay, Crete, Greece. In the beginning Commodore Charalampos THYMIS, the NMIOTC Commandant welcomed the attendees. This year was another unique experience because COVID kept the speakers and participants from attending in person the seminar. However, the seminar was conducted through webinar, but still presented speakers that delivered valuable knowledge and information about recognizing gender inequality and addressing possible solutions, which are necessary for maritime security challenges.

Wendi O. Brown, Lieutenant Colonel U.S. Army Reserve, provided this report. (email: 1wendibrown@gmail.com )

## Keynote Speaker

LTC Diana Morais

Head of the Office for Equality of the Ministry of Defense in Portugal

Chair-elect of the NATO Committee on Gender Perspectives (NCGP)

The NATO 2030 initiative is intended to ensure that the alliance of nations remains ready to face tomorrow’s challenges. Leaders will make decisions on the substantive and forward-looking NATO 2030 agenda to deal with the expected challenges of the future. In this future, where does maritime security stand?

## Three Critical Points

- The impacts that the new global geopolitical dynamics are having on the security and defense of the maritime domain.
- The role of women in maritime security.
- How can NATO engage and leverage the integration of gender perspective in maritime security?

The impacts that the new global geopolitical dynamics are having on the security and defense of the maritime domain.

- Recognize unrestrained access to global maritime supply routes for trade or other vital infrastructures (like data-carrying underwater cables) is under pressure from increased geopolitical competition with potentially hostile actors with an increasing global naval presence.
- Address violence at sea as a result of irregular attacks by transnational, non-state actors in the form of piracy, terrorism or other illicit activities and organized crime.

The role of women in maritime security.

- Illegal, unreported, and unregulated (IUU) fishing. These activities decimate fish stocks, erode the maritime environment and put economic hardship on coastal communities, and although it is known that the majority of the forced labor in illegal, unreported and unregulated fishing is conducted by male and children, women are also reported to play a major role in fisheries value chains includ-

ing production, marketing, and the provision of after-sales service.

- Women are also subject to sexual abuse, as the “fish-for-sex” phenomenon has shown us, where women engage in sexual work with fishers in order to obtain fish to sell and support their families.

- Piracy against ships threatens the economy by interfering with international maritime trade. Women are joining piracy gangs; it should also be noted that piracy gangs require

support structures and networks for their operations that are essential to their success. This results in the involvement of women through multiple tasks such as cooking and cleaning for the piracy gangs or the hostages during lengthy negotiations.

How can NATO engage and leverage the integration of gender perspective in maritime security?

- In recent years NATO has been implementing the women, peace and security agenda aimed at protecting civilians in armed conflict, countering human trafficking and preventing and responding to conflict-related sexual violence. It has worked to incorporate the gender dimension of security (including operational, moral, political, and legal considerations) into NATO operations, including maritime operations.

- Despite all efforts, the integration of gender perspective in the development of NATO’s strategic documents is something that should require further attention.

- Maritime strategies and policies should respond to a human security approach, addressing, inter alia, actions against the illicit acts against women and girls at sea in addition to gender-balanced and trained navies, that include gender experts – male or female -, that will be able to better protect them from gender-based violence but also to empower these women and girls.

## SESSION 1

### Gender Perspectives in Maritime Security Policy

Lecture: Is Maritime Security Gender-Blind?

Dr. Ioannis Chapsos

## Assistant Professor in Maritime Security at CTPSR - Coventry University

- UN Resolution 1325 on Women, Peace and Security: no reference to the maritime domain
- Existing literature focuses on the links between gender and security / human security but the maritime domain is largely overlooked

Three contemporary maritime security challenges:

- Maritime Piracy
- Illegal, Unreported and Unregulated (IUU) fishing
- Fisheries Crimes

Three main categories:

- Security providers
- Crime perpetrators
- Victims

### Security Providers

The STATE as the primary security provider

- Masculinity largely governs the role of states' security providers in the maritime space
- Women first allowed to join the Royal Navy in roles other than nurses and do 'men's jobs' at sea in 1993
- In 2019 women were approximately 10% of the Royal Navy's workforce - the Royal Navy named as one of the UK's top employer for women
- First ever women allowed to start training with the Royal Marines as late as 2019
- Women increasingly gain a standing and closing this employment diversity gap.

The private security sector as a contemporary trend in security provision

- Industry overwhelmingly dominated by male operatives
- Security Industry Association: approximately 10% of the workforce is female, albeit mainly in land-based roles (leadership development, executive, mentoring and increasingly in IT)
- Stereotypes and prevailing assumptions about masculinity and femininity preoccupy images of who can actually be Privately Contracted Armed Security Personnel (PCASP)
- Who would expect to see a female PCASP providing armed security services against pirate attacks onboard vessels transiting the Indian Ocean?
- Female PCASP Ruth Tiik at interview: '... I think they are shocked, as they often haven't seen a female doing security before... I hear about other girls doing CP stuff, but only on land, I have never bumped into any others doing the maritime stuff down here' [The Circuit magazine for security & protection specialists (2018): 'Women in Maritime Security']

### Crime Perpetrators

- Stereotypes preoccupy images of who can be pirate ... or even a victim!

- Piracy a 'man's job/ crime'; women are not expected to go at sea, due to religious, cultural or even physical endurance issues.

- Women with very active/ land-based roles in Somali piracy: relationship facilitators, resource dealers, care workers, financial investors etc.

- In Indonesia, Eva Novensia named as 'Pirate Queen' by her country's mainstream media in one of the most infamous domestic cases of piracy - 7,5 years in prison for facilitating piracy, when the ship she owned was used in an attack on the Singaporean-flagged MT Joaquim, in the Malacca Strait in August 2015. [Fenton, A.J. & Chapsos, I. (2019) 'Prosecuting Pirates: Maritime Piracy and Indonesian Law', Australian Journal of Asian Law, Vol. 19, No. 2, pg 9-10].

### Victims

- Piracy victims predominantly males - as of 2019, women represented only 2% of the world's 1.2 million seafarers (IMO, 2019).

- Women as both direct & 'indirect victims' of piracy – exploited in Somalia as sex workers, hostage carers, etc. / caring for family when men taken hostage -> vulnerable

- Fishermen often victims of piracy – offshore fishing another 'men's job' / women can hardly be found onboard fishing vessels in the high seas, their roles in the fishing industry are limited closer to the coast and even more on land

- In 2014, women accounted for 19% of all persons directly engaged in capture fisheries and aquaculture and represented about half of the estimated 56.6 million people working both on land and on board the over 4.6 million fishing vessels that exist globally (FAO 2016)

- In 2015, more than 2,000 fishers were rescued in 2015 in Indonesia from modern slavery conditions, all males. [Chapsos, I. and Hamilton, S. (2019) 'Illegal fishing and fisheries crime as a transnational organized crime in Indonesia'. Trends in Organized Crime, 22 (3): 255-273]

- Trafficked fishermen away from home for extended period of time (usually for years) – indirect effects on women who are left behind to look after and provide for the family hence become more vulnerable

- Women in forced labour conditions in seafood processing industry ashore; female exploitation 'sex for fish'

### Conclusions

- Maritime delimitations and zones largely define and affect the relationship between gender and maritime security.

- Both men and women can be identified as security providers, as well as perpetrators and victims of maritime crimes but men are predominantly active at sea while women on land. Maritime crimes occur at sea but infrastructure, networks and support on land make them possible à land-sea nexus and land dimensions of maritime

crimes à both genders play active roles

- Gender approaches to security should consider the maritime dimensions

### **Lecture: Women in Maritime Security Frameworks: Expanding the UNSCR 1325 at Sea**

**Dr. Marianthi Pappa**

**Assistant Professor in law at the University of Nottingham**

United Nations Security Council Resolution (UNSCR)1325

- UNSCR 1325: dedicated to women, peace and security.
- Dual scope: to protect women during conflict and to increase women's participation in peace processes.
- Through eighteen points, it calls for the prosecution of crimes against women and the increased representation of women at all decision-making levels of conflict resolution. It also outlines the actions which the Security Council, the Secretary General, the UN departments and member States should take in order to 'mainstream gender' into the peace and security agenda.
- Unanimously adopted by the Security Council on 31 October 2000.

Should the UNSCR 1325 be expanded at sea?

- The current maritime security frameworks are unable to address the challenges which women face at sea. The UNSCR 1325 promotes a gender-sensitive approach in the security sector.
- The UNSCR 1325 can contribute in 3 ways:
  - by acting as an 'umbrella' framework, it can extend the principles of gender equality (as these exist for land contexts) in maritime settings and enhance harmonization among the relevant (national, international) developments in the maritime domain.
  - it can offer a collective response to gender inequalities in land and maritime security and encourage the development of good practices in individual sectors (e.g transnational organised crime, IUUF, human trafficking).
  - it can promote gender mainstream in decision-making processes of maritime security, as it does on land.

### **Lecture: Mainstreaming Gender in Maritime Security Research**

**Ms. Eleanor Braithwaite**

**Office of the NATO Chief Scientist**

The focus of this lecture was centered on the first NATO Chief Scientist Research Report, which was published in May 2021. This report is an aggregation of the collaborative, cross-national research conducted by the NATO Science & Technology Organization (STO) over 20 years examining issues affecting women serving in the armed forces. This wide-ranging and valuable research is broken down in the report into four main areas as follows:

- Employment and Integration
- Sexual violence and harassment
- Kit and Equipment
- Health

You can read the full report here: <https://bit.ly/32RjJbX>

Below, four research activities which were detailed in the lecture are profiled. The following information has been taken directly from the report.

#### Integration of Women into Ground Combat Units

This System Analysis and Studies (SAS) research team formed to research the social, cultural, and psychological factors that impact gender integration in military organizations, focusing on integrating women into ground combat units.

#### Main Objectives

- To identify the influence of social, cultural, and psychological factors of gender integration in ground close combat units and their impact on combat effectiveness.
- To identify effective processes and strategies for the integration of women in ground close combat units.
- To identify appropriate methodologies for monitoring, measuring, and assessing integration.
- To share best practices through collaboration.
- Critical Findings
- Operational effectiveness can be enhanced by the participation of women in combat teams.
- Leaders play an essential role in promoting inclusion to ensure that unit cohesion remains strong and that marginalized and underrepresented members are effectively integrated.
- Task cohesion has a more significant impact on team performance than social cohesion.
- Targeted recruitment efforts are an essential step in ensuring that interested and capable women will have an opportunity to engage in ground combat roles as their military career choice.

#### Multinational Military Operations and Intercultural Factors

This Human Factors and Medicine (HFM) research team came together to consider the impact of intercultural factors that influence multinational military collaboration.

#### Critical Findings

- Culturally-rooted gender differences in multinational military operations can contribute to tension or misunderstanding, both in the interaction between contingents as well as between contingents and the host population.
- Differential treatment between deployed men and women may interfere with effective operations and successful

mission accomplishment.

- Cultural sensitivity and awareness may wish to be promoted through pre-deployment programs and training for all military personnel.

#### Gender component

Factors discussed in the literature that may create tension or the possibility of misunderstanding in multinational military operations include:

- Stereotypes
- Hierarchical rigidity
- Differences in interaction and serving status
- Ethnic and religious groupings
- Cultural and religious attitudes toward women
- The composition of military contingents that vary on the basis of gender

#### Civilian and Military Personnel Integration and Collaboration in Defense Organizations



Figure 2: NATO Allies are deploying more women on operations and missions (Credit: NATO)

This Human Factors and Medicine (HFM) research team was formed to research strategies and approaches for effective personnel management of military and civilian workforces in defence organizations.

#### Main Objectives

- To review and assess current knowledge and research in the area of civilian and military personnel work culture and relations in defense organizations.
- To extend the understanding of civilian and military personnel work culture and relations in defense organizations through theoretical analysis and empirical studies
- To develop and test a conceptual model of military and civilian work culture and relations, identifying challenges and enablers of effective civilian-military interaction and collaboration in defense organizations
- To generate recommendations for best practices for effective personnel management of both military and civilian workforces.

#### Approach

Existing data sources, databases, as well as policy and strategic documents were examined in order to understand and compare military and civilian workforces within

defense organizations, and the policies and directives that guide their management. The Military-Civilian Personnel Survey (MCPS), administered to nearly 8,000 civilian and military personnel working in departments or ministries of defense in 11 Allied and Partner nations, was also developed to identify critical aspects of military-civilian working relations.

#### Critical Findings

- Women constitute a lower percentage of the military workforce compared to their representation within civilian defense workforces.
- Male military and civilian members report a more positive military-civilian workplace environment compared to female military and civilian members.
- The study's overall results were mixed, perhaps reflecting other factors such as national culture and local workplace dynamics.

#### Combat Integration: Implications for Physical Employment Standards (PES)

This Human Factors and Medicine (HFM) research team came together to identify best practices for the development of Physical Employment Standards (PES) in Combat Integration.

#### Main Objectives

- Develop a research framework for designing PES to eliminate the potential for gender bias and develop agreed usage of terminology.
- Provide advice and guidance on injury prevention and physical training strategies linked to PES for Combat Integration, specifically:
  - Facilitate international research efforts to monitor Musculoskeletal risk through longitudinal investigations.
  - Identify female-specific training strategies for achieving and maintaining PES.
  - Produce a final technical report with practical recommendations for designing PES to support Combat Integration.

#### Critical Findings

- Designing PES that accurately reflect the job/task will reduce sex-based differences compared to traditional fitness testing metrics and represent a more valid selection of the right performer for the job.
- The introduction of PES that reflect the physical demands of a job-role will result in a reduction in MSKI risk and positively influence job-related physical training.
- Compared to men, women experience some performance-enhancing benefits resulting in better preservation of lean mass and faster recovery following stressful long duration Military Field Exercises.
- Additional research is needed to better understand physiologically-appropriate timelines for return to duty and the implementation of safe physical training programs during

pregnancy and post-partum.

- Personnel and health care providers need to be educated on the medical issues that may follow pregnancy.

**Lecture: Progressing Gender Perspectives – an Art not a Science**

**Mrs. Helen Hale**

**MARCOM/Deputy GENAD**

From strategic planning to practice adding a gendered perspective brings its challenges:

- Little resistance to giving Gender Perspectives presence – greater resistance for wider implementation
- Perceived limited opportunity for civilian engagement
- Lack of reference to Maritime in policies and official documents
- Preventing or solving the problem – needs to be applied before problem arises not just in response.
- Looking outwards and inwards – to be applied with the widest lens

However, there are great opportunities for this gender perspective momentum:

- Awareness and preparedness – an asset ready to be utilized
- Future policy makers – gaining knowledge
- Acknowledge that this movement is an art not a science – a gendered perspective does not always present itself with flashing lights
- External audiences – applying demonstrates values of organization
- Turning the lens internally – look at your won blind spots
- Organizational diversity and inclusion – encourages embracing of gender perspectives.

**SESSION 2**

**Gender Mainstreaming in Maritime Operations**

**Lecture: Gender Perspective in Maritime Security / Operation EUNAVFOR MED IRINI**

**Captain Agnieszka Makrucka, POL(N)**

**Operation IRINI/GENAD**

Core Task: Countering Illicit Arms Trafficking (CIAT)

UN Security Council Resolutions:

- UNSCR 1970 (2011) – Establishing the Arms embargo
- UNSCR 2292 (2016) – Authorizing boardings and diversions
- UNSCR 2526 (2020) – Extending UNSCR 2292 mandate up to 5 June 2021
- UNSCR 2578 (2021) – Extending UNSCR 2292 mandate up to 3 June 2022

Secondary Tasks:

- Gathering Information Oil Smuggling - UNSCR 2146 (2014), UNSCR 2362 (2017), UNSCR

2509 (2020), UNSCR2571(2021)

- Contribution to the Human Smugglers Business Model disruption
- Training and Monitoring Libyan Coast Guard & Navy (LCG&N)

Operation EUNAVFOR MED IRINI GENDER ACTION PLAN		
	INTEGRATION (i.e. How and where do we gender mainstream?)	PARTICIPATION (i.e. How do men and women take part in the work?)
INTERNAL (i.e. How do we organize our own work?)	Work structure of the Operation	Mission personnel and equal opportunities
EXTERNAL (i.e. How is the external situation addressed in order to achieve the mandated objective?)	Mandate interpretation and execution	Cooperation, support and representation

**Lecture: The cooperation between the EU monitoring mission (EUMM) and UN Women in Georgia**

**Major Sander Agterhyis**

**GENAD/SME Gender, 1GNC**

Georgia is an ambitious country with a western orientation. The country plans to implement reforms and adhere to democratic and western values in EU NATO. As part of this ambition Georgia adopted a National Action Plan 1325.

**National Action Plans for the Implementation of UNSCR 1325 on Women, Peace, and Security**



In addition, Georgia teamed up with UN women on the issue of domestic violence using male role models. UN-WOMEN women asked the national rugby team to speak out against domestic violence. Rugby is a very popular sport in Georgia. The rugby players agreed to take part in the campaign and appeared on a poster with a slogan condemning violence against women and the number of a toll free help-line. The EU monitoring mission helped to distribute the poster during its patrols. While doing so, and partly because of the popularity of the rugby players, the distribution of the poster offered an opportunity to talk with interlocutors (police, military, and civilians) about an otherwise very sensitive topic.

**Lecture: Gender intelligent strategies to attract, promote and maintain women within the broad military maritime domain**

**Captain Silvia Stanciu ROU(A), “Carol I”  
National Defense University Bucharest**

Gender Intelligence is based on three dimensions

- Biological dimension - uses the brain science findings
- Social dimension – studies the social status and its implications associated to each gender
- Cultural dimension – organizational culture, leadership commitment, diversity and inclusiveness attitude

All three dimensions provide accurate understating of behavioral tendencies and determine main human thinking processes such as decision making, problem solving, conflict resolution, stress resistance, emotions management and communication which are under gender influence.

**Background Information**

- 2% of the world’s seafarers are women
- The Navy - the most underrepresented service
- NATO – women represent less than 15% of staff within this service category
- Maritime sector – still largely perceived as of male resort
- Target: multinational, integrated maritime force

**Gender Intelligent Strategies**

To Attract:

- Authentic role models – both women and men.
- Better use of media channels to give substantial information on the opportunities of a Navy career.
- Expand talent pool selection by insisting on diversity.
- Employ Navy leaders as Champions of Change – and actively promote them as stakeholders in gender mainstreaming.
- Align your military organization to the expectations of the society you need to secure.

To Promote:

- Lead by example.
- Have male formal and informal leaders guarantee their strong support and career mentoring for female staff.
- Offer constant feedback – surpass the minority complex.
- Networking and coaching on the challenges regarding the full spectrum of aspects that comprise the Navy career.
- Develop specialized military curricula regarding the proficiency of gender diversity within matters regarding social life and career - at peace or during missions / operations.
- Take all the necessary measures for the armed forces to prevent and respond to gender-based discrimination and sexual harassment.

To Retain

- Support all staff in the quest of balancing both professional and personal dimensions of life.
- Leaders need to commit to learning and leading gender intelligent teams.
- Ensure an inclusive working environment where diversity of the human resource is 100% capitalized.
- Further insist on representation of women – niche for career advancement.
- Implement strategies that focus on flexible achievement of career milestones.

**Conclusion**

Gender Intelligence – provides greater career opportunities, open to everyone on the principle that great minds think unlike and basically implies men and women, working and striving to succeed together, in terms of being equal in value not in numbers.

**SESSION 3**

**Engendering Contemporary Maritime Security Challenges**

**Lecture: Human security in the South Pacific – between the legal consequences of ocean change and gender perspective**

**Dr Joanna Siekiera**

**Postdoctoral Fellow Faculty of Law, University of Bergen, Norway**

Climate change differently men and women because of their gender role in villages, local communities, church parishes etc. In the Pacific these different gender roles are influenced by culture, social systems, local institutions and religion, and it varies across the Pacific Islands.<sup>1</sup>

• Pacific Women face persistent inequality relative to men within the patriarchal society, including access to decision-making, high rates of sexual and gender-based violence, poor working conditions, increased risk of HIV/AIDS and STIs, declining access to customary land rights and property right,<sup>2</sup> along with limited economic opportunities, which all makes them more vulnerable to climate change impacts.

• Women are raised with gender specific roles and responsibilities in their families and communities.

• Adopting gender-responsive approaches is essential in achieving cost-efficient adaptation measures, disaster risk reduction and sustainable development for the region.<sup>3</sup>

Yet, we can observe the slow change, accelerated nomen omen by ocean change. Women become active agents of change and their unique knowledge and skills should be acknowledged and integrated into any projects/policy to develop resilience strategy towards the effects of sea-level rise.

Another institution that exists in communities is the

churches. This system, even though men are heads of the organizations, women and youth are the most influential; they know everyone, as well as know how to get through people in order to influence decisions. The same goes with civil society organizations, strongly supported by the UN Women: They have established a useful handbook: The Pacific Gender and Climate Change toolkit is designed to support climate change practitioners in the Pacific islands region to integrate gender into their programmes and projects.<sup>4</sup>

As gender relations are influenced by culture, Pacific women are actively involved in the process of performance of traditional dance,<sup>5</sup> traditional clothes, etc. In addition, most resources are communally owned by men, whereas women have limited access, being however able to generate income by selling handicrafts. This powerful cultural engagement by women is used in addressing ocean change issue, popularizing the topic, familiarizing the broad audience, not necessarily educated, with the matter and their own possible actions. We might even say that the impacts of climate change have introduced a new era in male dominance societies, where women now bring in more income for families and contribution to development projects in their villages, communities, maritime nations.

Finally, gender is also considered as a priority in The Pacific Adaptation To Climate Change Project held by The Secretariat of the Pacific Regional Environment Programme<sup>6</sup> examples are planting salt tolerant varieties of plants and locating community-water tanks.

### Lecture: International gender obligations and maritime operations linked to irregular migration by sea from a Spanish Perspective

<sup>1</sup> [https://gendercc.net/fileadmin/inhalte/dokumente/4\\_Our\\_Work/past\\_projects/Pacific\\_Islands/Gender\\_relations\\_in\\_the\\_Pacific\\_case\\_studies.pdf](https://gendercc.net/fileadmin/inhalte/dokumente/4_Our_Work/past_projects/Pacific_Islands/Gender_relations_in_the_Pacific_case_studies.pdf)

<sup>2</sup> <https://gsdrc.org/publications/gender-issues-in-the-pacific-islands/>

<sup>3</sup> <https://www.unclearn.org/wp-content/uploads/library/unwomen704.pdf>

<sup>4</sup> <https://www.unwomen.org/en/digital-library/publications/2015/9/pacific-gender-and-climate-change-toolkit>

<sup>5</sup> UiB project with the University of the South Pacific.

<sup>6</sup> [https://www.sprep.org/news/gender-priority-pacific-adaptation-climate-change-project?\\_\\_cf\\_chl\\_jschl\\_tk\\_\\_=61f62e355e2dba4e5851f424d93d4134696e8630-1622455887-0-AW2ZpS1g2YF55pL55sVhobGXZjjHl5-E9RyTHNrFO9XDJK76KNGM0fpJ6B5wxledx-ua4irRBfejwxDc3wRa3CrPhHAXz5uL7QnNmjHrxA5OLZgUzY-iZ0FVsYE34xRkdchTAI1hZUSKqdRjCu-GF5JXlIbf5-gQYvMmDBtd-K1ZgNSFABMPOe5kKFPgnUO9CridBjirjHuKUjVgWU6mXlJrV65N-quyK6UavkhJN7Yo9m2x3i4-Yv3jBL2GiKDIWmfqzyHUOox0fCkKT5-OdKu8ph5Pt0zazze\\_EZUVXl8gxBHGX2WMAZ8a-aLtQqORlrKmbzd-6dUbVF8amVfJn7-G9wye5-GNqfidS-kGOYWnvMFNaFP1sGuKjpb-derYmkgzoluKOY4O92zcw5nTe5XgUKG4weYlI3sNJPRqcUfgP-8K8Vp2tvK2oDyVN7bNv8MZo8HpVIWtkee5BVqgQ\\_UvQZdluV-f83aQwv6x57\\_tKhwiu1](https://www.sprep.org/news/gender-priority-pacific-adaptation-climate-change-project?__cf_chl_jschl_tk__=61f62e355e2dba4e5851f424d93d4134696e8630-1622455887-0-AW2ZpS1g2YF55pL55sVhobGXZjjHl5-E9RyTHNrFO9XDJK76KNGM0fpJ6B5wxledx-ua4irRBfejwxDc3wRa3CrPhHAXz5uL7QnNmjHrxA5OLZgUzY-iZ0FVsYE34xRkdchTAI1hZUSKqdRjCu-GF5JXlIbf5-gQYvMmDBtd-K1ZgNSFABMPOe5kKFPgnUO9CridBjirjHuKUjVgWU6mXlJrV65N-quyK6UavkhJN7Yo9m2x3i4-Yv3jBL2GiKDIWmfqzyHUOox0fCkKT5-OdKu8ph5Pt0zazze_EZUVXl8gxBHGX2WMAZ8a-aLtQqORlrKmbzd-6dUbVF8amVfJn7-G9wye5-GNqfidS-kGOYWnvMFNaFP1sGuKjpb-derYmkgzoluKOY4O92zcw5nTe5XgUKG4weYlI3sNJPRqcUfgP-8K8Vp2tvK2oDyVN7bNv8MZo8HpVIWtkee5BVqgQ_UvQZdluV-f83aQwv6x57_tKhwiu1)

### Dr Isabel Lirola-Delgado

Full Professor for International Public Law. University of Santiago de Compostela

Spain as one of the main European Union destination countries for irregular migration from Africa via the Mediterranean and the Atlantic.



### Profile and gender issues

- In most cases they come from Black African countries
- Some of them are pregnant
- They often travel in the boat with babies or very young children
- In all cases their journey is linked to the smuggling of migrants
- In many cases they are subject to human trafficking
- In most cases they have suffered assaults, exploitation and sexual harassment at all stages of the journey

Why is it difficult to integrate a gender perspective into maritime operations linked to irregular immigration in the case of Spain?

- Multiplicity of stakeholders: No single protocol or policy on gender issues.
- Invisibility of gender issues during the “operation” versus the moment of disembarkation: Need for coordination

Spain needs to incorporate more intensively its international obligations and commitments on gender issues in maritime operations related to irregular immigration:

- Adoption of contingency planning systems for sea arrivals with a gender perspective, including rescue and interception operations
- Establish coordination between all stakeholders participating in maritime operations
- Incorporate instruments to connect gender issues arising during the maritime operation and after disembarkation

Spanish participation in joint maritime operations can serve to create a number of synergies related to:

- Collection of disaggregated gender data
- Capacity building and training on gender issues

- Integration of a gender perspective into all areas of the operation

**Lecture: The gender dimensions of child piracy in Somalia**

**Miss Lizzy Norman**  
**PhD Coventry University**

**Gendered roles of child pirates**

- Boys are more visible as girls do not go out to sea, but rather engage with pirate networks onshore
- Roles reflect the gender dynamics of Somali society - girls used to carryout domestic tasks and some used for sexual purposes
- Some girls engage in more ‘frontline’ roles on land, acting as stakeouts or guards for female hostages
- Boys are likely to be promoted from land-based to sea-going roles

**Why do girls engage with pirate networks?**

- Victims trafficked or forced into sexual relationships or marriages with pirates
- Because they are attracted to the status of pirates
- Because they think it offers the financial means to leave
- They have a personal connection to a pirate network
- For the same reasons linked to state fragility as their male peers do

**Lecture: New technologies and gender equality**

**Dr. Nikitas Nikitakos**  
**Professor, Dept. of Shipping Trade and Transport, University of the Aegean**

**4<sup>th</sup> Industrial Revolution Technologies** favoriot



**Four gender related dimensions of 4th Industrial Revolution Technologies**

- Structural change
  - When considering women’s future access to quality jobs, it should be noted that although there has been an historical tendency for women to be concentrated in repetitive work, recent trends found women to be outperforming men in entering non-routine jobs requiring analytical or interpersonal skills.
- Change to the nature and quality of work
  - Women remain underrepresented in key growth areas such as jobs requiring science, technology, engineering

and math (STEM) knowledge and skills, accounting for 23% of core STEM occupations in 2017 (WISE 2017).

- This pattern persists despite women successfully moving into previously male-dominated areas such as life sciences and medicine. Their underrepresentation is particularly acute in the ICT sector, where levels of female employment are dropping (to 17% in 2017, from 18% in 2016), and where they tend to be concentrated in the lower-paid sectors (WISE 2017).

- Change to the employment relationship
  - The gendered implications of these changes in the employment relationship are evident from women’s disproportional representation in non-standard forms of employment and solo self-employment.
  - Those working in the gig economy (is a free market system in which temporary positions are common and organizations hire independent workers for short-term commitments) currently represent a relatively small share of the workforce, but this type of employment is on the increase.
  - Online platforms have international reach and may offer new opportunities to women with limited access to the formal economy, but gendered promises of freedom and flexibility are situated in a context where around 60% of the world’s population – many of them women in low- and middle-income countries – still lack internet access (OECD 2017).
  - The majority of these self-employed have been found to have a stable income and to be independent – not working for a single client. However, around two-fifths are classified as low paid and one-fifth receive low or medium pay and are also insecure
- Change to access to work during the period of childbirth and childrearing
  - Concerns change in access to work over the period of childbirth and childrearing
  - At the same time new technologies could potentially make it easier for employers to accede to requests for flexible working, thereby perhaps reducing the proportion of women pushed into self-employment or the gig economy after childbirth. Again, the issue is not with the technology but the policies of employers

**Main Recommendations for Change**

- While technology can help facilitate home-based working, to date this has primarily benefitted higher-status, male occupations, while women self-employed teleworkers experience a greater risk of work–life spillover. Rethinking the social relations of gender could transform home-based working to provide wider benefits for women.
- Given the growing demand for STEM knowledge and skills, the issue of low representation of women workers needs to be addressed.
- Increasing levels of non-standard forms of employment and precarious work has been intensified by digitalization, leading to increasing fragmentation. The emergence of

platform-based working and gigs may appear to benefit women.

#### SESSION 4 Women in the Maritime Domain, Regional Case Studies

**Lecture: Women in the maritime: the Danish approach to gender-equality in shipping**

**Dr Jessica Larsen**

**Anthropologist and researcher at the Danish Institute for International Studies (DIIS)**

Women in the shipping industry: room for improvement

- Only 1-2% are women in global shipping
- Only 3% are women in Danish shipping

The Way Forward: the case of Denmark

Danish Shipping is currently promoting women in shipping through a three-step approach.

Step 1: Task Force

Danish Shipping created a task force to examine how the industry can attract and retain more women in the maritime education system and in the maritime sector and to develop recommendations to shipping companies.

Step 2: Charter for More Women in Shipping

Danish Shipping launched a charter with concrete goals that signatories must follow to: a) increase women in shipping; b) ensure equal opportunities; and c) implement measurable efforts to train, recruit and retain women in shipping.

Step 3: Action Plan

Danish Shipping developed an action plan to hand-feed the industry with best practices and ready-made packages that can be customised to any company's need.

The Action Plan is simple, practical and concrete: it asks management to specify the timeline, targets, deadline and responsible person to ease the success of implementation.

Step 4: Reflection

Added to the three-step approach, Dr. Larsen introduced the need for taking a step back to reflect on some of the unintended consequences or knock-on effects that may come out of the work on gender equality.

Particular attention needs to be paid to the following:

1. Don't only rely on numbers

There are lies, damned lies and statistics – Benjamin Disraeli

When tracking progress on gender equality, numbers can cover up lop-sided developments within the company, or within the industry as such. Look beyond the quantity to

the quality.

2. Avoid pink-washing

Don't tell it, show it – Ernest Hemmingway

It is easy to use the right hashtags and create visibility around a company's gender equality work on SoMe. Make sure it is backed up by real progress.

3. Gender is not only about women

Women's rights are human rights, and human rights are women's rights – Hillary Clinton

Just like we must include the two M's – men and management – in the dialogue on gender equality, we must be aware that gender is a more complex spectrum of self-identification than the male-female dyad.

**Lecture: The invisible Woman of the Royal Navy**

**Miss. Erin Bisset**

**Assistant Head Efficiency British Army**

Recommends the book, *The Invisible Woman* by Caroline Criado Perez.

Investigates the shocking root cause of gender inequality and research

Representation of the world is described by the words according to men. Unfortunately, the point of view from women are not included.

**Lecture: Beyond gender rhetoric in African Maritime operations**

**Ms. Liezelle kumalo**

**Researcher, Institute for Security Studies in South Africa**

**Mr. Denys Reva**

**Research officer, Institute for Security Studies in South Africa**

Beyond gender rhetoric in African Maritime operations

- In Africa gender is often understood in term of a binary division between males and females, and most gender equality programs in the maritime sector focus on women
- A proper gender analysis of maritime operations is needed that considers intersectionality of age, race and social status as well as sex
- Part of solution is to understand what drives gender inequality through an intersectional approach, for instance, by using the Moser framework
- The goal is to have gender transformative practices that are reflected in the maritime sector

#### SESSION 5 Gender Diversity and Equality

**Lecture: Gender diversity in maritime industry and the way ahead**

**Mr. Diogenis Venetopoulos**

**DPA/CSO Partner Variety Cruise**

Variety Cruise has small ship experiences and is very successful in entertaining their customers. Management in the cruise line industry has conducted critical think tank sessions and decided one of their 17 targets of the cruise line industry is to implement and maintain gender equality.

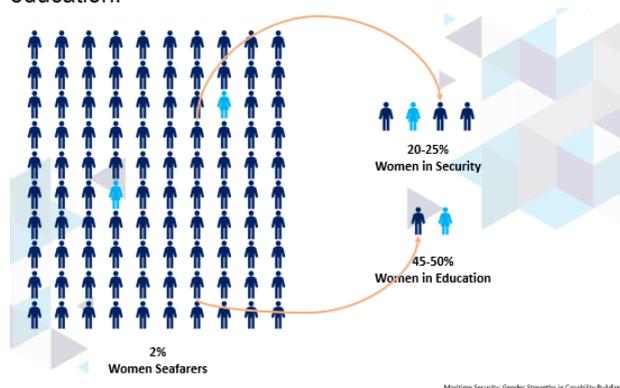
**Lecture: Maritime Security: Gender strengths in Capability Building**

**Mrs. Chrysanthi Laimou**  
**Maritime College manager/Diaplous**  
**Mrs. Lamprini Panagopoulou**  
**Maritime Security Expert**

The Diaplous Group – The most reliable global partner of total security services covering any physical or cyber threat against the crew, the vessel, the cargo and the whole value chain

while remaining compliant to all the directives from the International Organizations and the Governmental regulations.

The Diaplous Group recognizes the lack of women as seafarers compared to other industries such as security and education:



Regardless of gender, the focus of the maritime industry can shift towards the existence of various skills, their assessment and finally, cultivation through professional development, training and education.



**Lecture: Gender Neutrality, Equity, or Equality in the maritime domain**

**Mrs. Nikoleta Chalanouli**  
**Legal expert in international law**

Gender in the maritime domain is often examined under a

sociological aspect, resting mostly on the participation of women in the maritime industry and the steps that need to be undertaken to achieve a gender balance therein. The presentation under the topic of gender neutrality, equity or equality, presented the topic from a legal perspective. It answered the question of whether the law has a gender biased approach and whether this legislative bias is what leads or contributes to a continuous imbalance in the maritime domain. First it focused on the concept of gender neutrality in the law of the sea and then it proceeded in pondering on whether this concept translates into equality in the maritime domain, and whether an equity consideration is needed in order to achieve gender equality.

This is an interesting approach, since the law of the sea has traditionally been considered as one of the most well-established and technical areas of International Law, relying on a robust convention such as the UNCLOS and landmark cases such as the Lotus and the North Sea Continental Shelf ones. Rules such as those regarding coastal delineation, fisheries, and flag states for example have been viewed as operating beyond gender considerations, implying at least to some extent gender neutrality (Isabel Lischewski (JCL 18 (2020), 652)). The first part of the presentation pondered on this gender-neutral aspect of the law of the sea in the maritime domain. And indeed, the aspects mentioned above, fall under a technical category, that would make it challenging to attribute gender bias to them. At the same time, authorities in international law, such as Chinkin, have indicated the research of sociologists such as Gilligan, who have highlighted that the female approach to justice relates more to the “ethic of care” and sees “things in terms of relationships, responsibility, caring, context, communication;” while a male approach relies “on an “ethic of rights” or “justice” and analyze[s] problems in abstract terms of right and wrong, fairness, logic, rationality, winners and losers, ignoring context and relationships.” (Hilary Charlesworth, Christine Chinkin & Shelley Wright, AJIL 85 (1991), 615). If that theory is to be followed, simply having male dominated negotiating teams when developing law, would translate into a de facto gender-biased legislation. When examining UNCLOS, it is often indicated that the words used in it make for masculine assumptions. Words such as fishermen instead of seafarers are used and “shipmasters, operators, contractors, members of the Governing Board and the Director-General of the Enterprise, members of the International Tribunal for the Law of the Sea and its President, as well as the Secretary-General of the United Nations, are all assumed to be male.” (see Articles 47, 51, 61, 62 and Papanicolopulu (ed.), Gabriele Goettsche-Wanli, (2019), p. 51). However, Scovazzi (Papanicolopulu (ed.), Tullio Scovazzi (2019), p. 147) questions whether such teleological importance should be given to words and indicates the change that happens in the Spanish text of UNCLOS, when the sea becomes the high seas (el mar to la alta mar).

Hodson further indicates that concepts such as that of the high seas, as that has been determined in the Lotus case of the International Court of Justice, entail a feminist aspect. It allows for a lack of specific State control and for a feminist use of the construct. Hodson delves into how the high seas for example, can be used to allow for women to ensure control over their own bodies and reproductive rights; women who would otherwise be unable to obtain a legal abortion, can do so in the high seas, through a specific NGO who has taken advantage of the lack of sovereignty in the high seas under the law of the sea (Papanicolopulu (ed.), Loveday Hodson, (2019), 135).

The debate surrounding the neutrality of the law of sea and the gender imbalance in the maritime domain and its industry, indicate that there is a disconnect between the theoretical gender neutrality that a technical field of law should bring and its actual implementation. The current male domination in the maritime industry and maritime security indicate that gender equality has not been achieved despite the fact that the law has not been specifically developed to discriminate between gender roles. When such a gender imbalance however, exists, simply applying quotas, or changing pronouns or words when referring to seafarers does not achieve gender equality. This is where equity becomes relevant. It is not a matter of determining the rights and obligations of women in the maritime domain and attribute an equal piece of a pie. It is a matter of pinpointing gender vulnerabilities and intervening in an affirmative manner in order to achieve the sought-after equality. This exercise might appear to be an imbalanced one; equity is different than equality because it concerns itself with fairness. Equality requires equal amounts. The first can be understood to be a bridge to achieving the latter. And while the law can assist in changing preconceived notions, it is not the only actor. Gender equality in the maritime domain requires a multidisciplinary approach and an attitude change from all involved actors.

As a conclusion it was the presenter's view that the legal field under examination, when seen on its own, is not a discriminatory one; it is a field that, at least in its inception,

has striven for answering fundamental technical questions. At least this appears to have been the effort of one of its most influential authorities, Elisabeth Mann Borgese, a woman.

### **Lecture: Gender Parity in Maritime The invisible barriers and systemic errors that need correction**

**Mrs. Kate Bollanou  
Executive & Leadership Coach Maritime Diversity & Inclusion**

The three steps towards sustainable gender parity

- Creating Awareness
  - o Meetings between leaders and female team members
  - o Reciprocal mentoring programs with junior female members of staff
  - o Upward mentoring programs
- Collaboration And Understanding
  - o Managing inequality moments when they happen
  - o Actively manage women's careers
  - o Entry interviews
  - o Allyship programs
- Taking Action
  - o Define what "good" means to you
  - o Equality as an annual KPI
  - o Thorough selection of employees, partners and suppliers

### **CLOSING REMARKS**

With a prominent keynote speaker and 18 powerful lectures from established maritime security experts and academic professionals, this seminar successfully addressed and discussed the lack of females in maritime security and emerging solutions to close the gender gap.



NMIOTC Course 26000  
“Tactical Combat Casualty Care (TCCC) / Combat Lifesaver (CLS)  
in Maritime Operations”

Contributing to the continuous improvement of staff’s performance, NMIOTC conducted the Course 26000 “Tactical Combat Casualty Care/ Combat Lifesaver (CLS) in Maritime Operations” from 1st to 5th March 2021, for staff members from Greece, Poland, Germany and Czech Republic.

The aim of this course was to provide knowledge and practical skills, in order to improve survivability on the battlefield by delivering necessary pre-hospital care with limited equipment and in confined spaces, based on the newest Co - TCCC Guidelines for Combat Lifesaver.

Training was delivered by certified instructors specialized in combat medics and in absolute coherence with NAEMT’s policy and regulations.



NMIOTC Annual Information Meeting & Advisory Board 2021

NMIOTC’s Annual Information Meeting (AIM) and Advisory Board (NAB), chaired by NMIOTC Commandant, were held at the Center’s premises on Thursday 4th February 2021.

This year due to the current COVID-19 pandemic situation and in absolute coherence with standing World Health Organization (WHO) guidelines, further to the physical participation, there was also Virtual participation. During the meetings, representatives of the Sponsoring Nations were informed about NMIOTC activities and achievements of 2020 and also provided advice to the Commandant for the effective execution of his mission.



### NMIOTC'S Change of Command Ceremony

On Tuesday 16th March 2021, the Change of Command Ceremony was held in NMIOTC. Commodore Panagiotis Papanikolaou GRC (N) handed over the Command to Commodore Charalampos Thymis GRC (N).

The Chief of Staff of the Hellenic National Defense General Staff, Lieutenant General Georgios Fasoulas GRC (AF) presided over the ceremony.

All the preventive measures due to COVID-19 pandemic were followed.



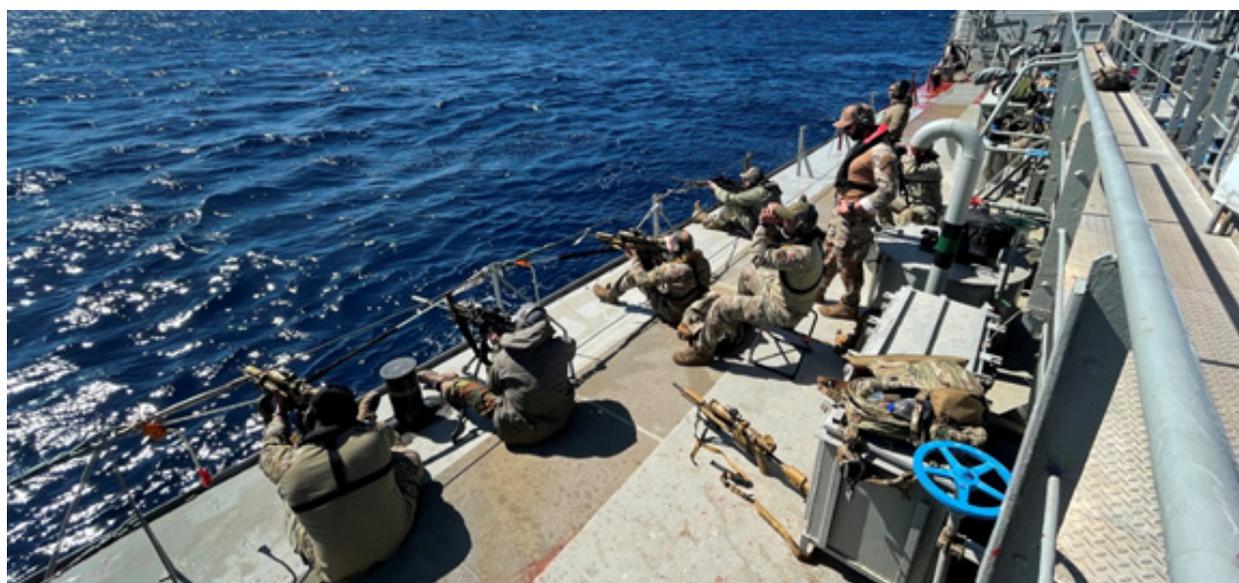
### NMIOTC Course 27000 Maritime Sniper Course

From 19th to 23th April 2021 the NMIOTC Maritime Sniper Course is taking place at NMIOTC premises and in the broader area of Chania Crete.

During the course, the participants will:

1. Engage and deliver fire from land to floating targets at sea
2. Engage and deliver fire from helicopter to stable and also towed targets at sea.
3. Engage and deliver fire from a naval vessel to stable and also towed targets at sea.
4. Plan and conduct Sniper Operations in Maritime Environment.

The course is attended by 22 trainees from 6 countries (Belgium, Greece, Italy, Malta, Netherlands and U.S.A.).



NMIOTC Coordination Board (NCB) 2021

The NMIOTC Coordinating Board (NCB) was convened on the 12th of May 2021 at NMIOTC premises chaired by the Director of Education and Training Directorate of the Hellenic Navy General Staff and co-chaired by a representative from SACT JFD Branch Head Education and Training Plans and Programs through VTC.



NMIOTC Course 6000 – “WMD in MIO”

From 17th to 21st of May 2021, the NMIOTC Course 6000, “Weapons of Mass Destruction in Maritime Interdiction Operations” (WMD in MIO), was conducted at NMIOTC premises.

In total eight (8) trainees coming from three (3) countries (Greece, Malta and Qatar) attended the course. Five (5) Subject Matter Experts from Greece and the Defence Threat Reduction Agency (DTRA), were invited to support the course as augmenters as well as from JCBRN CoE via VTC, in addition to the Centre’s Instructors and Lecturers.



### 12th NMIOTC Annual Conference 2021

The 12th NMIOTC Annual Conference took place on 1st and 2nd June 2021 at NMIOTC premises, titled “Opportunities and Threats from Innovative and Disruptive Technologies: Shaping the Future of Security in the Maritime Domain”. It was attended by 131 participants from 27 Allied and Partner Nations, International Organizations, the international academic community and representatives from the shipping and IT industry.

Deputy Chief of the Hellenic National Defence General Staff, Vice Admiral Ioannis Drymouisis opened the Conference with the Host Nation welcome address. Among the keynote speakers were, the Commander of the Bulgarian Navy, Rear Admiral Kiril Mihaylov, the Chief of the Romanian Naval Forces, Rear Admiral Mihai Panait and the Commander of Bahrain Coast Guard, Major General Alaa Abdulla Seyadee.

This year due to the current COVID-19 pandemic situation in addition to the physical conference, a virtual conference has been delivered simultaneously.

The aim of the conference was to discuss issues and share perceptions of the international community on how technological innovations will shape Maritime Security, considering the full range of disruptive technology implications in the Maritime Domain.



### Gender Perspectives in Maritime Security Seminar

From 3rd to 4th June 2021 the Gender Perspectives in Maritime Security Seminar, was co-organized with Coventry University’s Centre for Trust, Peace and Social Relations and Nottingham International Law and Security Centre and was conducted virtually at NMIOTC through “GoToWebinar” platform.

The aim was to encourage collaboration in the utilization of the gender perspective in the Maritime Domain across the spectrum of Peace, Crisis and War.

82 participants and 22 speakers from 29 countries attended the seminar, consisting of scientific, industrial, naval staff, maritime and academic researchers, practitioners, members of maritime associations, shipping companies, governmental departments/bodies, international organizations and agencies, the public and private sector in general.



### NMIOTC Pilot Course 15000 “Migrant Handling Team Issues in Maritime Interdiction Operations in Support of International Efforts to Manage the Migrant and Refugee Crisis at Sea”

From 14th to 18st of June 2021, the NMIOTC Pilot Course 15000 “Migrant Handling Team Issues in Maritime Interdiction Operations in Support of International Efforts to Manage the Migrant and Refugee Crisis at Sea”, was conducted at NMIOTC premises.

The aim of the course was to deliver the appropriate knowledge and practical skills to members of the Security and Recovery teams of naval units in order to prepare them to fulfil their tasks on Migration Related Incidents at Sea.

In total seven (7) trainees coming from three (3) countries (Egypt, Greece and Poland) attended the course.





*Training of HS SPETSAI Boarding Team  
January 19-21, 2021*



*Training of HS THEMISTOKLIS Boarding Team  
January 26-28, 2021*



*Training of GRC SOF Team  
February 15-26, 2021*



*Training of USS PORTER Boarding Team  
February 19-22, 2021*



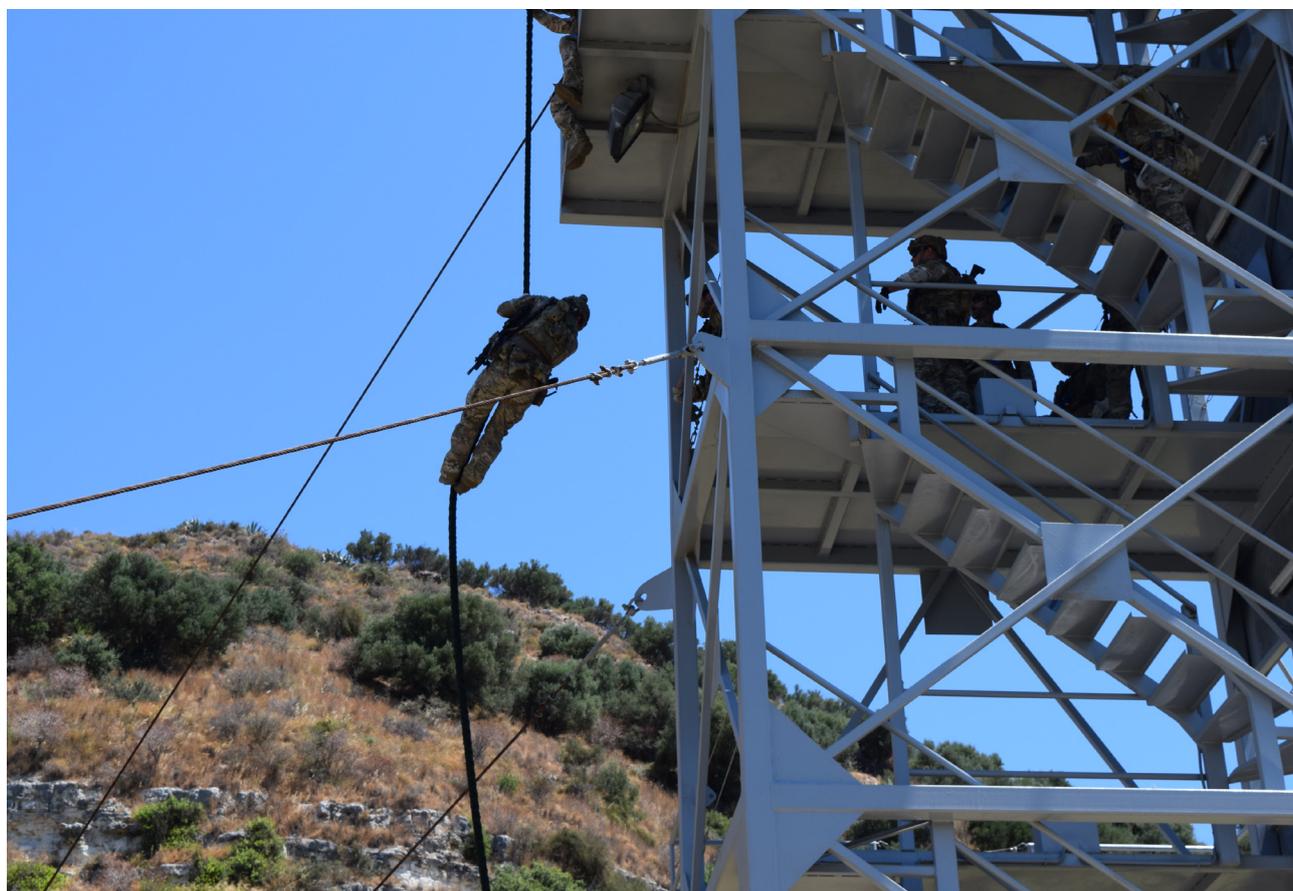
*Training of Hellenic Navy UDT  
February 22-26, 2021*



*Training of 24 Marine Expeditionary Unit  
May 10-21, 2021*



*Training of HMS DEFENDER Boarding Team  
June 2-4, 2021*



*Training of Maltese Armed Forces Team  
June 7 - July 2, 2021*



*Visit of the Defence Attaché of the United Kingdom  
March 9, 2021*



*Visit of the SOCEUR Delegation  
March 18, 2021*



*Visit of the US Army Europe and Africa Delegation  
April 21, 2021*



*Farewell Courtesy Call by the US Defence Attache,  
Captain (N) Tim Ketter  
June 17, 2021*

# NMIOTC Program of Work 2021 (NPOW 2021)

JANUARY							FEBRUARY							MARCH																
WK 01	WK 02	WK 03	WK 04	WK 05	WK 06	WK 07	WK 08	WK 09	WK 10	WK 11	WK 12	WK 13	WK 14	WK 15	WK 16	WK 17	WK 18	WK 19	WK 20	WK 21	WK 22	WK 23	WK 24	WK 25	WK 26	WK 27	WK 28	WK 29	WK 30	WK 31
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APRIL							MAY							JUNE						
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OCTOBER							NOVEMBER							DECEMBER						
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### COURSES (LETC ID)

- 1 Course 1000 - Command Team MIO Issues (MOP-MO-31201)
- 2 Course 2000 - Boarding Team Theoretical Issues (MOP-MO-21203)
- 3 Course 3000 - Boarding Team Practical Issues (MOP-MO-31205)
- 4 Course 4000 - MIO Final Tactical Exercise (MOP-MO-31207) (Upon Request)
- 5 Course 5000 - Maritime Operational Terminology Course (MOP-MO-21208)
- 6 Course 6000 - Weapons of Mass Destruction in MIO (WMD-MD-31209)
- 7 Course 7000 - MIO in support of Counter Piracy Ops (MOP-MO-31210)
- 8 Course 8000 - C-IED Considerations in Maritime Force Protection (IED-ED-31679)
- 10 Course 10000 - MIO in Support of Countering Illicit Trafficking at Sea (MOP-MO-32012)
- 12 Course 12000 - C-IED in Maritime Interdiction Operations (IED-ED-31904)
- 13 Course 13000 - Command Team Issues in MIO in support of International Efforts to Manage the Migrant and Refugee Crisis at Sea (MOP-MO-22015)

### ACTIVITIES

- 1 NAB (NMIOTC)
- 2 NCB (HNCS)
- 3 NMIOTC Annual Conference
- 4 Cyber Security Conference
- 5 Nuclear Policy Symposium (NPS)
- 6 Cyber Gordon Knot
- 7 Cyber Hot-Summer School
- 8 OSG in Brief
- 9 Gender Perspectives in Maritime Security Seminar
- 10 CLOS COE CDMD WG
- 11 Site Visit AFRICOM
- 12 Site Visit Force Recon Marines
- 13 Helanic National Defence College International Course
- 14 EEZ Course British Embassy
- 15 Core Planning Team Activation (CPTA) / Scripting Workshop (SWS) / Initial Planning Conference (IPC) for SHAPE Exercise Steadfast Interest 2022-1
- 16 NSOS SOF Instructor Course

### EXERCISES / METTS

- 1 PHOENIX EXPRESS (US Armed Forces) WETT
- 2 SEA BREEZE (UKR Navy) WETT
- 3 BREEZE (RGN Navy) WETT
- 4 Malta METT
- 5 Exercise MARSEC 21

### TAILORED TRAININGS

- 1 USMC 24 MEU
- 2 DETRA (US)
- 3 Malta Armed Forces (VBSS)
- 4 US DDG-ROSS
- 5 Malta Armed Forces (Resident Course 2000)
- 6
- 7 Malta SOF (Resident Course 1000)
- 8 USMC Force Recon DFT
- 9 Malta Armed Forces (Resident Course 1000)
- 10 SEAL Team 10 E&F
- 11 HMS DEFENDER FN & RM
- 12 SEAL Team 10 E&F
- 13 ROS PM 274 BT & CT
- 14 GERMAN BT BEK II
- 15 IRISH SOF TT
- 16 FORMOZA POL NAVY SOF

Updated 23 July 2021



■ Conference - Meeting   
  Unit Training   
  National Holidays   
  Available Period for Training   
  Evaluation of Courses / Maintenance



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