

volume

3

ASCOMARE YEARBOOK ON THE LAW OF THE SEA 2023



*Maritime Security,
New Technology and Ethics*

Edited by
Pierandrea Leucci and Ilaria Vianello

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ON THE LAW OF THE SEA

2023

*Volume 3:
Maritime Security,
New Technology
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The *Associazione di Consulenza in Diritto del Mare* (ASCOMARE) is dedicated to promoting the study, uniform interpretation, and application of the international law of the sea, including the United Nations Convention on the Law of the Sea, 1982, and its implementing instruments. The work of ASCOMARE is inspired by human rights considerations and environmental principles. The *ASCOMARE Yearbook on the Law of the Sea* strives to serve as a tool to support the work of international law experts, judicial bodies, policymakers, and legal practitioners in the field of the law of the sea.

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Cover image: Njaheut, 'Louie', 2020.

*A chi lotta per la libertà.
A chi difende ciò che resta dell'essere umani.*

Ilaria Vianello and Pierandrea Leucci
The Hague and Lecce, December 2023

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Foreword

Security is ingrained in our DNA. It has guided our survival compass for thousands of years. Throughout history, we have constructed tools, shelters, machines, and established rules and relationships to protect ourselves from the perils of both individual and collective annihilation. We have survived and thrived to the point where our own existence has turned into a source of insecurity for ourselves and for the world we inhabit. Social disruption, terrorism, ecocide, and war are just examples of anthropogenic pressures on global and human security. The list is long and varied and encompasses both traditional and non-traditional security challenges with a maritime dimension and impact, such as piracy, human smuggling, illegal fishing, and environmental crimes. They inform the content of what scholars and policymakers routinely refer to as maritime security; a term receiving growing attention in public and academic debates on the law of the sea. With advancements in technology, various tools and systems have been developed to prevent and detect maritime security threats and to improve the safety of assets and people operating at sea. Yet, technology does not come without risks. From the use of MASS, datafication, and artificial intelligence to cybercrimes, critical infrastructures, and the protection of privacy and digital lives, international law compels us to investigate the legal and ethical implications

of the use of new technology in connection with maritime security, including the need to ensure proportionality (North-South) in developing regulatory mechanisms for accessing and sharing technology, resources, and knowhow. This volume aims to analyse and discuss contemporary challenges and opportunities of maritime security in the context of the law of the sea and related matters.

Pierandrea Leucci

President of ASCOMARE

Lecce, December 2023

A handwritten signature in dark ink, consisting of a stylized 'P' followed by a series of loops and a long horizontal stroke.

List of abbreviations

AI:	Artificial Intelligence
AIS:	Automatic Identification System
AMTI:	Asia Maritime Transparency Initiative
AR:	Augmented Reality
ASEAN:	Association of Southeast Asian Nations
AUV:	Autonomous Underwater Vehicle
BBNJ:	Biodiversity Beyond National Jurisdiction
C-188:	Work in Fishing Convention (No 188), 2007
CCTV:	Closed-circuit Television
CETC:	China Electronic Technology Group Corporation
CFP:	Common Fisheries Policy
CFSP:	Common Foreign and Security Policy
COLREGS:	International Regulations for Preventing Collision at Sea, 1972
COSIS:	Commission of Small Island States on Climate Change and International Law
CSC:	Continental Shelf Convention, 1958
DRC:	Democratic Republic of the Congo
DNA:	Direzione Nazionale Antimafia
DOALOS:	UN Division for Ocean Affairs and the Law of the Sea
EDPS:	European Data Protection Supervisor
EEZ:	Exclusive Economic Zone
EMSA:	European Maritime Safety Agency
ESA:	European Space Agency
EU:	European Union
EUNAVFOR:	European Union Naval Force
Europol:	European Police Office

EUROSUR:	European Border Surveillance System
FAL:	IMO's Facilitation Committee
FAO:	Food and Agriculture Organization
FONOP:	Freedom of Navigation Operations
FSB:	Federal Security Service of Russia
GAIRS:	Generally Accepted International Rules and Standards
GEO:	Group on Earth Observation
GEOSS:	Global Earth Observation System of Systems
GMTDS:	Global Maritime Traffic Density Service
GNOME:	General National Oceanic and Atmospheric Administration Operational Modelling Environment
ICOADS:	International Comprehensive Ocean Atmosphere Data Set
ICOW:	Issue Correlates of War
ICJ:	International Court of Justice
IHO:	International Hydrographic Organization
ILO:	International Labour Organization
IMF:	International Monetary Fund
IOM:	International Organization for Migration
ISA:	International Seabed Authority
ITLOS:	International Tribunal for the Law of the Sea
IUU:	Illegal, Unreported, and Unregulated
IMO:	International Maritime Organization
ISM Code:	International Safety Management Code, 1993
JWG:	Joint Working Group
LEG:	IMO's Legal Committee
MAP:	Maritime Awareness Project
MARPOL:	Convention for the Prevention of Pollution from Ships, 1973

MASS:	Maritime Autonomous Surface Ship
MATS:	Maritime Assertiveness Time Series
MAVD:	Maritime Assertiveness Visualization Dashboard
MDA:	Maritime Domain Awareness
MEPC:	IMO's Marine Environment Protection Committee
MLC:	Maritime Labour Convention, 2006
MR:	Mixed Reality
MSC:	IMO's Maritime Safety Committee
NBR:	National Bureau of Asian Research
NCEI:	National Centre for Environmental Information of the United States
NGA:	National Geospatial-Intelligence Agency of the United States
NGO:	Non-governmental Organisation
NOAA:	National Oceanic and Atmospheric Administration of the United States
PCA:	Permanent Court of Arbitration
PCASP:	Privately Contracted Armed Security Personnel
PLA:	People's Liberation Army of China
PRC:	People's Republic of China
PSSA:	Particularly Sensitive Sea Area
PSC:	Port State Control
REM:	Remote Electronic Monitoring
RFMO:	Regional Fisheries Management Organization
RSE:	Regulatory Scoping Exercise
SAR:	Search and Rescue
SAR Convention:	International Convention on Maritime Search and Rescue, 1979

SFPA:	Sustainable Fisheries Partnership Agreement
SOLAS:	International Convention for the Safety of Life at Sea, 1974
SRFC:	Sub-regional Fisheries Commission
SUA Convention:	Convention for the Suppression of Unlawful Acts Against the Safety of Maritime Navigation, 1989
TEU:	Treaty on European Union
TFEU:	Treaty on the Functioning of the European Union
UAE:	United Arab Emirates
UAV:	Unmanned Aerial Vehicle
UMV:	Unmanned Maritime Vehicle
UN:	United Nations
UNCTAD:	United Nations Conference on Trade and Development
UNEP:	United Nations Environment Programme
UNFCCC:	United Nations Framework Convention on Climate Change
UNFSA:	United Nations Fish Stocks Agreement, 1995
UNHCR:	United Nations High Commissioner for Refugees
UNCLOS:	United Nations Convention on the Law of the Sea, 1982
UNODC:	United Nations Office on Drugs and Crime
USA:	United States of America
USV:	Unmanned Surface Vehicle
UUV:	Unmanned Underwater Vehicle
VCLT:	Vienna Convention on the Law of Treaties, 1969
VIIRS:	Visible Infrared Imaging Radiometer Suite
VMS:	Vessel Monitoring System
VR:	Virtual Reality
XR:	Extended Reality

A fin, a tale, a sail and a wave – where do we go from here?

■ *Mekhala Dave**

When we think of the vast ocean space, we think, among other things, of movement. The majestic humpback whales cover the longest distances within the ocean space, migrating from cooler habitats in the summer to warmer ones in the winter. They move latitudinally from the north to south, from the Arctic to Mexico, both along and off the shores. An individual humpback whale helps to sequester carbon, equivalent to thousands of trees. Their fertilization maintains the health of marine ecosystems, and upon their death, they sink to the ocean floor, taking 33 tons of carbon out of the atmosphere for centuries.

Similar majestic movements have been made by humans. The great Atlantic Slave Trade was a journey undertaken by many black bodies, from land to sea, from fin to tail, with each wave breaking rhythm, each drowning a descent into the abyss – into the unknown. The Martinique scholar Édouard Glissant captured this past experience as “an open

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boat”, a sense of drowning “in the belly of the whale”, both lyrical and metaphorical: the multiplicity of hidden narratives and meanings carried within the undercurrents of the ocean space.

In parallel with these movements, humans and multispecies perceive the ocean space as a captivating intertwining of numerous journeys. Beyond the physical bodies, encircling lines, and grids suggested by colonial legacies to confine, control, and claim ownership of the ocean, the spaces become complex. Sovereign claims carry significant weight on the global map as they regulate, govern, and manage the ocean space, which ebbs and flows amidst troubled waters. How much do these claims detract from the glory of the ocean space and its abundant resources? Within the infrastructure of the ocean space, a complex web of networks and systems is established, facilitating the exchange of cultures, languages, services, technology, labor, and commodities. This mixture further mystifies the ownership of the ocean space and, with sovereign claims interfering, how do we, through design, knowledge, and speculative measures, contribute to both its extractivism and protection?

Such is the dilemma of our planetary crisis today: in our communal set up of infrastructures and despite technological advancement, we sail with boats and ships, use aqualungs to soar into the ocean space, employ technological visuals and acoustics to map the ocean space, and use devices for the extraction of its resources, which plunge in, devastate, and change the marine architecture. In the face of climate change, the ocean space and its inhabitants, such as the humpback whales, continue to be our greatest allies in combating the impacts of climate change.

This violence that is inflicted is a *slow violence*, a term coined by the scholar Rob Nixon. A violence that unfolds in the space and time continuum, much of it is hidden from view because of the agents, causes, effects, and consequences, and progresses to deepen into spaces that affect both ocean inhabitants and communities on the frontlines – all the while

overwhelmingly difficult to comprehend the scale of ecological devastation over time.

“We sweat and cry of salt water”, the scholar Teresa Teaiwa mentioned. This means there are no clear boundaries between the ocean space, communities, and movements that dovetail the endless thread of consequences, binding us all together in one large block of uncertainties resulting from our collective actions. This is precisely what is captured by the image (*L’ouie*, by Njaheut) on this Volume’s cover.

Bodies of water traverse the realms of humans, multispecies, and technology, blurring distinctions. The connectors of this fusion – their cable wires – lie on the ocean floor for miles. The minerals required to produce these devices in future supply chains will traverse the ocean space, transforming it into an economic and labor-intensive field for attempts at green energy transition to combat climate change and its impacts. This connection – clouds of data – is indeed part of the ocean space, much like the hunted humpback whales and the black bodies lost at sea during the great Slave Trade journey. Moreover, the intangible data of the acoustics of humpback whales calling to one another or the bodies that now remain part of the ocean in their disintegrated, invisible form. This evocation, in this sense, is of timeless information, running in braids of shared knowledge – knowledge that is transmitted to one moment, space, person, multispecies, wave, particle at a time.

Volume 3 offers commentary from various perspectives on the ocean space and its infrastructures, aiming to understand what comes to be, what or who can belong, and how we govern. It is important to acknowledge that our perspective of the ocean space should not be limited solely to sovereign claims, law, and policy. Instead, we must recognize that law and policy are intertwined with broader infrastructural frameworks, histories, memories, and lived experiences, originating from the hidden and invisible spaces of the ocean. For instance, the hunting of humpback whales led to near extinction, prompting a global sovereign power

to impose a moratorium on their hunting. The vast grids of cable wires transmitting information offer connectivity, yet they also create differential power challenges between sovereign powers. Additionally, deep-sea mining raises questions about the ocean's last frontier for extractivism and whether it truly benefits all. This volume is truly about the patterns at play: codes of law and policy are the result of defining, or rather, re-defining relations and shared knowledge of the ocean space. It's a pivotal moment to reflect on its potential engagement within a larger mapping between a fin, a tale, a sail, and a wave. Where do we go from here?

NJAHEUT is a Belgian-Cameroonian photographer, art director and film director. Passionate about drawing, he joined the art school ESA-St Luc in Brussels before continuing his studies at the film school SAE in Brussels. Moving from drawings to the production of music videos and films, he finally found his happiness with photography, which allows him to fully express his creativity. The first tool in photography being light, NJAHEUT wonders about its mirror that is shadow and finds a parallel with his favorite subject: identity. "When we confront human beings with their identity, we stop at the appearance and not at what we could see, like their personality". With the human at the center of his photographs, NJAHEUT invites us to focus on bodies and objects rather than the interpretation we make of them. He leads us to reflect on the immateriality of the shadow, which allows us to escape from any identity, and suggests to question our stereotypes on the questions of gender, sexual orientation or ethnic origin. Through his unique point of view, he allows the viewer to see the rich complexity of our identities; a reflection that tells the human story in a poetic and metaphorical way, through a unifying message.

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Maritime security and the law of the sea: Piracy revisited

■ James L. Kateka*

1. Introduction

I am honoured to write the Introduction to Volume 3 of the ASCOMARE Yearbook 2023 on the theme of ‘maritime security, new technology and ethics.’

In examining the issue of maritime security, the correct approach seems to be to look at several factors. First, one must consider all actors: States and international organizations as well as the new non-State actors.¹ Second, new technological developments have changed the environment of maritime security.² Third, considerations of humanity in respect of human rights at sea have taken an increasingly prominent role in the law of the sea. Such rapid changes were not foreseen by the 1982 United Nations Convention on the Law of the Sea (UNCLOS or the Convention). Nevertheless, the starting point for interrogating maritime

* Judge of the International Tribunal for the Law of the Sea and Member of the *Institute de Droit International*.

1. Including NGOs and private enterprises. See David Ong, Karen Hulme and Darren Calley, ‘New Maritime Security Threats’, in David J Attard (et al.), *The IMLI Manual on International Maritime Law. Volume III* (OUP, 2014).

2. The robotics revolution has given birth to unmanned systems.

security is the UNCLOS which has been called the constitution of the oceans. The Convention addresses some maritime security issues without specifically using the term ‘maritime security’. One of the key issues dealt with in UNCLOS is piracy, which will form the main topic for consideration in this Introduction. And as we shall see below, where UNCLOS has failed to provide effective solutions, States and non-State actors have come up with their own solutions.³

2. Definitions

A brief consideration of terminology is attempted here before discussing the *Institut de Droit International* (‘the *Institut*’) resolution on piracy.⁴ There is no agreed definition of what constitutes maritime security. Some commentators regard maritime security as a blend of threats and activities by State and non-State actors. Some have tried to make a distinction between marine security⁵ and maritime security. However, they accept that the two concepts are interchangeable.

I am of the opinion that the better view is that which looks at maritime security holistically by not defining but enumerating activities and threats that are involved in maritime security. For example, the UN Secretary-General listed 7 threats, including piracy, in his Report on Oceans

3. Sofia Galani and Malcolm D Evans, ‘The interplay between maritime security and the 1982 UNCLOS: Help or Hindrance?’, in Malcolm D Evans, Sofia Galani (Eds.), *Maritime Security and the Law of the Sea – Help or Hindrance?* (Edward Elgar Publishing, 2020).

4. *Institut de Droit International*, ‘Piracy, Present Problems’ (30 August 2023), available at <https://www.idi-iil.org/app/uploads/2023/09/2023_angers_11_en.pdf>.

5. They see this as broad, denoting not merely threats to shipping and other traditional maritime activities, but also to coastal communities and even non-human environments. See Ong (et al.) (n 1).

and the Law of the Sea of 2008.⁶ To this can be added Klein's comprehensive notions of maritime security which include piracy and armed robbery at sea, terrorism, human/drug trafficking, proliferation of weapons of mass destruction,⁷ illegal fishing, and those that cause environmental damage.

3. Piracy revisited

The *Institut* considered the topic of 'Piracy, Present Problems' at its 81st session in Angers, France, in August 2023 and unanimously adopted a resolution ('the Angers Resolution').⁸ The resolution was a follow up to the Naples Declaration of 2009, whereby the *Institut* examined the topic of piracy at the height of the scourge.⁹ During the consideration of the Naples Declaration, the *Institut* concluded that the existing regime on piracy, as defined in UNCLOS, should remain the same. This view has been reaffirmed in the Angers Resolution, 14 years later after the Naples Declaration.

However, the Angers Resolution has gone further by including armed robbery at sea. At the Naples session, the *Institut* called on States to adopt or develop effective laws and procedures to suppress piracy and other acts of violence at sea such as terrorism, hijacking, and hostage taking.¹⁰ The *In-*

6. UN General Assembly, Sixty-Third Session, Item 73(a), Oceans and the Law of the Sea, Report of the Secretary-General (A/63/63), 10 March 2008 ¶ 39, 15.

7. Natalie Klein, *Maritime Security and the Law of the Sea* (OUP, 2011), cited at p. 511 in Ong (et al.) (n 1).

8. *Institut de Droit International* (n 4).

9. *Institut de Droit International*, 'Naples Declaration on Piracy' (10 September 2009), available at <https://www.idi-iil.org/app/uploads/2017/06/2009_Naples_EN.pdf>.

10. See James Kateka, 'Vessels' (Chapter 31), 715, in Marcelo Kohen and Iris Van der Heijden, *150 Years of Contributing to the Development of International Law: Sesquicentenary Book of the Institute of International Law (1873 – 2023)* (Pedone, 2023).

stitut cited UN Security Council Resolution 1816 (2008) and others that broadened the scope of territorial application to the territorial sea of Somalia as a *sui generis* situation which did not expand the definition of piracy.

The *Institut* has taken the right step in dealing with armed robbery at sea in Article 8 of the Angers Resolution, which comprises 10 articles. The acts of armed robbery, although not mentioned in UNCLOS, are the majority of threats to maritime security. Most of the violence against ships is committed in areas under national jurisdiction. This violence, therefore, needs to be addressed.

Armed robbery at sea is when acts of violence, depredation, or detention occur in the territorial sea, internal waters, or archipelagic waters, or when the dual condition of two ships is absent, and therefore cannot be considered as piracy.¹¹ Article 8 of the Angers Resolution defines armed robbery in similar terms to those in the International Maritime Organization (IMO) Code of Practice for the Investigation of Crimes of Piracy and Armed Robbery against Ships ('the IMO Code').¹² The Resolution goes further by encouraging States and international organizations to strengthen cooperation in the repression of armed robbery at sea or through the conclusion of regional arrangements and through participation in multilateral treaties for cooperation in criminal matters, such as the Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation (SUA Convention) and its Protocols.¹³ The Resolution calls on States and international organizations to take into consideration the

11. The definition is based on the IMO Code which is replicated in the 2009 Djibouti and 2013 Yaoundé Code: "1. Any illegal act of violence or detention or any act of depredation or threat thereof, other than an act of piracy, committed for private ends, and directed against a ship or against persons or property on board such a ship, within a State's internal waters, archipelagic waters and territorial sea. 2. Any act of inciting or of intentionally facilitating an act described above."

12. IMO Code, adopted on 2 December 2009. IMO Resolution A.1025(26).

13. Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation (adopted 10 March 1988, entered into force 1 March 1992) 1678 UNTS.

particular situation of States that lack the capacity to repress armed robbery at sea and to patrol sea lanes off their coast. This is interpreted as offering assistance to developing States in repressing armed robbery at sea.

UNCLOS distinguishes between piracy and armed robbery at sea mainly by the geographical scope of the crime. While piracy is committed on the high seas, armed robbery takes place in areas under national jurisdiction. The second key difference is that piracy requires two ships, the victim ship and the offending ship; whereas armed robbery is satisfied with one ship. The two-ship requirement does not account for mutiny or internal seizure, as happened in the hijacking of the cruise *Achille Lauro* in 1985. Legal and jurisdictional challenges arise due to some domestic legislation describing acts involving one ship as piracy. Given the definitional difficulties, the term 'piracy' tends to be used as a catch-all phrase to denote illegal activities at sea.¹⁴ Thus, piracy and armed robbery are currently dealt with together in common language, although they are legally distinct. The *Institut* has appropriately addressed these two interconnected issues in their proper context.

In addition, the Angers Resolution has clarified the distinction between traditional issues and emerging ones. On one hand, the *Institut* has elucidated the traditional issues related to the definition of piracy,¹⁵ on universal jurisdiction,¹⁶ and on ships and aircraft that are entitled to seize on account of piracy.¹⁷ On the other hand, the Angers Resolution has taken into consideration new developments, such as autonomous or remotely-operated craft,¹⁸ human rights of the victims and perpetra-

14. See Lisa Otto and Leanza Jernberg, 'Maritime Piracy and Armed Robbery at Sea' (Chapter 6), 99, in Lisa Otto (ed.), *Global Challenges in Maritime Security – An Introduction* (Springer, 2020).

15. Angers Resolution, Article 3, in relation to Article 101 of UNCLOS.

16. *Ibid.*, Article 4, in relation to Article 105 of UNCLOS.

17. *Ibid.*, Article 7, in relation to Article 107 of UNCLOS.

18. *Ibid.*, Article 3(4).

tors,¹⁹ and self-defense and privately contracted armed security detachments.²⁰ This approach of the *Institut* appears to be in line with the approach expressed above about the three factors to be taken into account regarding maritime security.

Before discussing the relevant provisions of the Convention in some detail, as well as the Angers Resolution, it is pertinent to comment on a difference in perspective regarding the interpretation of UNCLOS provisions on piracy, which is contrary to that of the *Institut*. It has been argued that because the provisions on piracy are detailed, they speak for themselves and do not need any elaboration through subsequent practice. It is further contended that as the piracy provisions are specific and precise, they cannot justify any evolutionary interpretation for an expansive construction.²¹ It is interesting to note that the *Institut* has taken the opposite view. It is stated clearly in the Angers Resolution that it concerns the interpretation and application of provisions on piracy, particularly in the light of subsequent international practice and relevant rules of international law. Rapporteur Scovazzi,²² when giving an overview of the draft of the Angers Resolution, stated that interpretation was necessary for traditional provisions – such as Article 101 of UNCLOS²³ – taking subsequent practice into account.

19. Ibid., Article 5.

20. Ibid., Article 6.

21. Anna Petrig, 'The Commission of maritime crimes with unmanned systems: an interpretive challenge for the UNCLOS' (Chapter 5), 120, in Malcolm D. Evans and Sofia Galani (n 3).

22. There were two Rapporteurs for the topic 'Piracy, Present Problems' which was dealt with in the *Institut* 11th Commission. Tullio Treves was the Rapporteur during the adoption of the 2009 Naples' Declaration on Piracy. Tullio Scovazzi became the co-rapporteur during consideration of what became the Angers Resolution.

23. It was stated by Rapporteur Scovazzi that certain articles of UNCLOS on piracy did not need interpretation. These are Article 102 (piracy by a warship), Article 104 (the retention or loss of nationality of a pirate ship or aircraft), and Article 106 (liability for seizure without adequate grounds).

4. Definition of piracy

Article 1(2) of the Angers Resolution states that UNCLOS provisions (on piracy) reflect customary international law. Hence the *Institut* has decided to interpret piracy provisions for clarification purposes and not for any implied change. The key elements of piracy remain the same and are examined in the *Institut* Report.²⁴

According to Article 101 of UNCLOS, an act of piracy is an illegal act of violence, detention or depredation. The intention to rob (*animus furandi*) is not an essential element of the crime. Piratical acts are criminal acts that are different from illegal violence, detention, or depredation. For example, trafficking in narcotics, drugs, or psychotropic substances does not constitute piracy.

Acts of piracy can only be committed by private ships for ‘private ends.’ The question is, how broad should the concept of ‘private ends’ be? Warships, military aircraft, and government ships cannot commit acts of piracy.

The *Institut* recalls that ‘private ends’ was mentioned in the Harvard Draft of 1932²⁵ for the sole purpose of excluding from the scope of piracy insurgents and independence movements that attack the ships flying the flag of the State against which they are fighting and not indiscriminately any ship.²⁶ This exclusion has been reaffirmed by the UN General Assembly in 1970:

24. *Yearbook of the Institute of International Law*, Volume 83, 81st Session of Angers, 2023, 155 – 238, 199. The geographical scope is the high seas and the two-ship requirement is necessary for piracy, as already explained above. The *Institute* Resolution does not deal with aircraft which have not raised any practical problem.

25. Harvard Research in International Law, ‘Draft Convention on Piracy, with Comment’ (1932) *American Journal of International Law Supplement* 26: 739.

26. 26 *AJIL* Supp. 739-886 (1932) 786.

Affirms the legitimacy of the struggles of peoples under colonial and alien domination recognized as being entitled to the right of self-determination to restore to themselves the right by any means at their disposal²⁷

Article 3 of the Angers Resolution clarifies Article 101 of UNCLOS. It provides that: “[a]cts, including acts of peaceful protest at sea, that do not involve illegal acts of violence or detention, or any act of depredation, do not constitute piracy under Article 101 of UNCLOS.”²⁸

The *Institut* has included this paragraph on peaceful protest on the basis of case law and some international instruments. In the *Arctic Sunrise* Arbitral Award, the Tribunal stated that protest at sea is an internationally lawful use of the sea related to the freedom of navigation.²⁹ It is a right recognized in several international human rights instruments, including the International Covenant on Civil and Political Rights. This right to protest at sea has been recognized by resolutions of international organizations. The right, however, is subject to limitations defined, *inter alia*, in UNCLOS.³⁰

Another innovative approach by the *Institut* has been the inclusion of a reference to autonomous or remotely-operated craft in Article 3(4)

27. GA resolution 2649(XXV) 1970. This is seen as legitimizing the use of armed means to assert the right to self-determination, a controversial issue.

28. Angers Resolution, Article 3(3).

29. The *Arctic Sunrise* Arbitration (Netherlands v Russia), Award on the Merits [2014] PCA 2014-02 (Arbitral Tribunal (UNCLOS, Annex VII)) [233–333, 401(C)], 51 ¶ 227.

30. In the matter of the *Arctic Sunrise* Arbitration – before an Arbitral Tribunal constituted under Annex VII to the 1982 UNCLOS – between the Kingdom of the Netherlands and the Russian Federation, Award on the Merits, 14 August 2015. Article 58(3) of the Convention requires that in exercising their rights and performing their duties in the EEZ, states shall have “due regard to the rights and duties of the coastal State and shall comply with the laws and regulations adopted by the coastal State in accordance with this Convention and other rules of international law in so far as they are not incompatible with [Part V of the Convention].”

of the Angers Resolution (on the definition of piracy).³¹ Although there have been no reported piracy cases involving remotely-operated vehicles so far, it cannot be ruled out that they will occur in the future. Regarding the question of whether new rules are required for unmanned systems, the *Institut* has taken the position that they are not required for acts of piracy. In this regard, Rapporteur Scovazzi has called for caution. It is better not to be too specific on remotely-operated crafts. Although there is no definition of unmanned technology or system,³² it is contended that as the notion of ship or aircraft includes unmanned vehicles, the principle should be followed that the rules applicable to ships, including submarines, and aircraft generally apply also to remotely-operated vehicles.³³ The *Institut* states that it could be broadly understood that the notion of ‘crew’ includes those who operate an unmanned vehicle.³⁴ This is still difficult to grasp in practice given the traditional approach to piracy, which requires human presence as necessary for the crime.³⁵

31. “Whether the acts are committed by or against autonomous or remotely-operated craft does not, *mutatis mutandis*, affect the application of Article 101 of UNCLOS”.

32. It denotes a vehicle that does not have the human operator physically on board the platform (US Defence Directive (2012) quoted by Petrig (n 21) 112.

33. *Yearbook of the Institute of International Law* (n 24) 199. “The general expectation appears to be that rules relating to surface vessels, submarines, and aircraft apply regardless of whether there are humans on board or not”. Natalie Klein, ‘Maritime Autonomous Vehicles within the International Law Framework to Enhance Maritimes Security’ (2019) 95 *Int’l L. Stud.* 244, 251.

34. *Id.*

35. Petrig (n 21)

5. Universal jurisdiction

Article 105 of UNCLOS provides that on the high seas or in any other place outside the jurisdiction of any State, every State may seize a pirate ship or aircraft, or a ship or aircraft taken by piracy and under the control of pirates, and arrest the persons and seize the property on board.

Article 4 of the Angers Resolution is about the interpretation of Article 105. Paragraph 1 calls for the interpretation of Article 105 in light of the duty to cooperate in the repression of piracy,³⁶ as provided for in Article 100 of the Convention.³⁷ Paragraph 2 of the Angers Resolution provides that a State, which has detained a person suspected of piracy, *shall* conduct an investigation and submit the case to its competent authorities for prosecution, unless that person is transferred to another State for investigation and prosecution. Article 4(2) of the Angers Resolution is a significant interpretation of Article 105 of UNCLOS. The latter provision uses the word *may* with regard to the use of universal jurisdiction for piracy acts. However, under Article 4(2) of the resolution, the word used is *shall*, which implies that exercising universal jurisdiction is mandatory. Special Rapporteur Treves explained to the members of the *Institut* that the practice of ‘catch and release’ would no longer be allowed. If pirates were arrested, they should be submitted to prosecution or transferred to another State for prosecution. Some members were concerned about this interpretation. Rapporteur Scovazzi viewed Article 4(2) as an

36. The principle of cooperation in general has been considered by ITLOS when it stated that ‘the duty to cooperate is a fundamental principle in the prevention of pollution of the marine environment under Part XII of the Convention and general international law and ... rights arise therefrom which the Tribunal may consider appropriate to preserve under article 290 of the Convention (*Mox Plant* (Ireland v UK), PMs Order, 3 December 2001, para 82).

37. Article 100 UNCLOS: All States shall cooperate to the fullest extent in the repression of piracy on the high seas or in any other place outside the jurisdiction of any State. See Article 2 of the Resolution for an interpretation of Article 100.

evolutionary interpretation of UNCLOS. He observed that the 'catch and release' practice, for example, off the Somali coast, was not compatible with UNCLOS.³⁸ The duty to cooperate implied the exercise of jurisdiction or the transfer of a pirate to another State. It bears repeating that the exercise of universal jurisdiction is still optional. However, once a State has detained a piracy suspect, it must investigate and either prosecute or extradite the suspect to another State. This *Institut* approach will help end the 'catch and release' practice of some States.

6. Human rights³⁹

The Angers Resolution considered the question of human rights which is not specifically provided for in UNCLOS. Article 5(1) of the resolution provides that States shall respect and ensure the human rights of victims of acts of piracy, including the right of access to justice to seek reparation and the right to compensation for damage and restitution of depredated property. According to paragraph 4 of the same provision, States must also respect and ensure the human rights of persons suspected of piracy, including the prohibition of torture and arbitrary or unreasonably prolonged detention. Under paragraph 6, there are limits to the use of force in taking counter-piracy measures. This is because the fight against piracy is seen as a question of law enforcement and not an operation of

38. Case of Denmark releasing 10 pirates on Somali shore for fear of their human rights being violated by Somali authorities if they were surrendered. The principle of *aut dedere aut judicare* is not respected for fear of costs or transferring suspects for trial to domestic courts of the arresting State.

39. Human rights is a broad concept which has an environmental aspect too in maritime security. For example, the dumping of hazardous wastes and toxic substances is a human rights security issue.

war.⁴⁰ Rapporteur Scovazzi thinks that the use of force against pirates is a mixed action, more police than military.⁴¹

Article 6 of the Angers Resolution states that the UNCLOS provisions on piracy do not prejudice the right of self-defence of any person against acts of piracy (paragraph 1). Paragraph 2 provides for governmental protection detachments or privately armed security personnel. It is the latter group that has attracted the attention of commentators in respect of self-defence against pirates. The *Institut* Report cites the IMO Guidance.⁴² But this is a non-binding instrument. The Report also mentions the *Enrica Lexie Incident* Arbitration involving Italian marines who acted under the apprehension that the *Enrica Lexie* was under a piratical attack. In the process the marines killed two Indian fishermen on board the St Antony fishing vessel.

Because of the controversial nature of private vessel protection detachments, a proposal by Rapporteur Scovazzi to include an addition stating that the UNCLOS provisions on piracy do not prejudice the right of self-defence of any person under threat of acts of piracy, as provided for by the applicable national legislation, was not accepted. It was not adopted by the 11th Commission. Furthermore, the IMO's position on the

40. ITLOS has observed that the distinction between military and law enforcement activities must be based primarily on an objective evaluation of the nature of the activities in question, taking into account the relevant circumstances in each case (*Detention of three Ukrainian naval vessels* (Ukraine v Russian Federation), Provisional Measures, Order, ITLOS Reports 2018 – 2019, p. 283, paragraph 66).

41. See Article 7 of the Resolution which states that Article 107 of UNCLOS does not prejudice the right of persons onboard an attacked private ship to detain suspected pirates and hand them over to a warship or military aircraft. Article 107 UNCLOS provides that seizure on account of piracy may be carried out only by warships or military aircraft, or other ships or aircraft in government service.

42. IMO Guidance to Ship owners and ship operators, ship masters and crews on Prevention and Suppression of Acts of Piracy and Armed Robbery against ships. MSC.1/Circ.1334 (23 June 2009). Available at <<https://www.wcdn.imo.org/localresources/en/OurWork/Security/Documents/MS.1-Circ.1334.pdf>>.

growing use of privately contracted armed security personnel (PCASP) has been cautious. The IMO states that the carriage of firearms on board merchant ships is a complex legal issue, with IMO member States taking diverse positions. The IMO's Maritime Safety Committee (MSC) states that ships using PCASP are subject to many diverse legal regimes. The MSC adds: "the carrying and use of firearms for personal protection or protection of a ship is strongly discouraged. The IMO neither endorses nor condemns the use of armed personnel."⁴³ Given this complex scenario, the *Institut* in its Report advocates early detection of a possible attack, which is a more effective deterrent than aggressive responses once an attack is underway.⁴⁴

7. Conditions conducive to piracy

Article 9 of the Angers Resolution is about conditions that are conducive to piracy. According to Article 9(1), States and international organizations should seek to alleviate situations that may create conditions conducive to piracy and armed robbery at sea. This is done in order to promote respect for human rights and the rule of law, strengthen State institutions, and ensure economic and social development.⁴⁵

The *Institut* and Rapporteurs cite political instability, which includes internal conflicts, human rights violations, and corruption. Poverty could similarly lead to people resorting to piracy. This raises the issue of the causes of piracy. In the context of the Somali coast and the Gulf of

43. Id.

44. Especially when the attackers have boarded the ship.

45. The existence of such situations does not exonerate persons from criminal responsibility for piracy and armed robbery.

Guinea, the question of illegal, unreported, and unregulated (IUU) fishing is linked to piracy. The local population feels disadvantaged by the illegal actions of foreign ships such as IUU fishing. This leads to alienation shared by the local population, which provides them with support.⁴⁶

8. Conclusion

The *Institut* has provided useful and helpful interpretative guidance in its ten articles of the Angers Resolution.⁴⁷ It has given interpretations and elucidations on piracy without proposing any changes to the core provisions that have become customary international law. The resolution will help achieve certainty and consistency on the fundamentals of piracy that will guide national and international courts, practitioners, and academics. The need for cooperation has been emphasized in the Angers Resolution.⁴⁸ This cooperation will help in the adoption of national laws as well as regional cooperative arrangements in the fight against piracy. Above all, the fact that the resolution was adopted unanimously will give it the necessary authority.

46. See *Yearbook of the Institute of International Law* (n 24) 228, footnote 324.

47. Article 10 is a without prejudice clause on measures taken by the UN Security Council. Measures taken by the Security Council are not regulated by the UNCLOS provisions on piracy. The Security Council could derogate the general regime on piracy in particular cases, as it did for the Somali coast. This is because of Article 103 of the UN Charter where the obligations under the Charter would prevail over obligations under other international agreements, including UNCLOS (*Yearbook of the Institute of International Law* (n 16) 230).

48. Angers Resolution, Article 2.

‘Military activities’ exception under the UNCLOS in recent international jurisprudence

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1. Introduction

It is my pleasure to contribute to the ASCOMARE Yearbook series focusing on issues of the law of the sea, in particular, to Volume 3, which is dedicated to maritime security. The article examines the consideration of the ‘military activities’ exception under Article 298, paragraph 1, subparagraph (b), of the 1982 United Nations Convention on the Law of the Sea (UNCLOS or the Convention) in the following four cases: one before the International Tribunal for the Law of the Sea (ITLOS or the Tribunal) – *Detention of three Ukrainian naval vessels (Ukraine v. Russian Federation), Provisional Measures*,¹ and three Annex VII arbitrations under the UNCLOS – the *South China Sea Arbitration*,² the *Dispute Concerning Coastal State Rights in the Black Sea, Sea of Azov, and Kerch Strait*,³ and the *Dispute*

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1. *Detention of three Ukrainian naval vessels (Ukraine v. Russian Federation), Provisional Measures*, Order of 25 May 2019, ITLOS Reports 2018-2019, 283.

2. *South China Sea Arbitration* (The Republic of Philippines v. The People’s Republic of China), Award, Merits, Permanent Court of Arbitration, 12 July 2016.

3. *Dispute concerning coastal state rights in the Black Sea, Sea of Azov, and Kerch Strait*, Award on Preliminary Objections, 21 February 2020, PCA Case N° 2017-06.

*concerning the detention of Ukrainian naval vessels and servicemen.*⁴ These cases have provided some clarification on the scope and interpretation of the relevant provisions of the Convention. They suggest several criteria for evaluating situations involving disputes concerning military activities.

2. General overview of the ‘military activities’ exception

Pursuant to Article 298(1)(b) of the Convention, a State may choose not to accept the compulsory procedures entailing binding decisions – provided for in section 2 of Part XV of UNCLOS – with respect to “disputes concerning military activities, including military activities by government vessels and aircraft engaged in non-commercial service.”⁵

As pointed out in the Virginia Commentary, paragraph 1(b) “...owes its origin to the preoccupation of the naval advisors to the delegations that activities by naval vessels should not be subject to judicial proceedings in which some military secrets might have to be disclosed.”⁶ As a result, the provision allowing States Parties to exclude from the compul-

4. *Dispute concerning the detention of Ukrainian naval vessels and servicemen*, Award on the Preliminary Objections of the Russian Federation of 27 June 2022.

5. Article 298 of the Convention (*Optional exceptions to applicability of section 2*) reads as follows: 1. When signing, ratifying or acceding to this Convention or at any time thereafter, a State may, without prejudice to the obligations arising under section 1, declare in writing that it does not accept any one or more of the procedures provided for in section 2 with respect to one or more of the following categories of disputes: [...] (b) disputes concerning military activities, including military activities by government vessels and aircraft engaged in non-commercial service, and disputes concerning law enforcement activities in regard to the exercise of sovereign rights or jurisdiction excluded from the jurisdiction of a court or tribunal under article 297, paragraph 2 or 3 [...].

6. Myron H. Nordquist, Satya Nandan, and Shabtai Rosenne, *UN Convention on the Law of the Sea, 1982: A Commentary* (Brill | Nijhoff, 2013) 298.33.

sory jurisdiction of the Convention 'disputes concerning military activities' was included in the Convention. Over two dozen States Parties to UNCLOS availed themselves of this opportunity.

It is clear from the text of Article 298(1)(b) that this exclusion is not automatic and requires a declaration to be made and deposited with the UN Secretary-General when signing, ratifying, or acceding to the Convention or at any time thereafter. According to Article 298(3), if a State Party has excluded a dispute concerning military activities, it may not submit any dispute falling within that category to any procedure in the Convention "as against another State Party, without the consent of that party."

A State Party might raise the military activities exception if the relevant declaration had been deposited with the UN Secretary-General before a dispute was submitted against that State Party. Thus, such a declaration would not affect proceedings pending before a court or tribunal if made when proceedings have already commenced. Neither proceeding would be affected in a situation where a State Party had initiated compulsory dispute settlement under the Convention in respect of a dispute that did not concern military activities but then in some way involved its military in relation to the dispute. The arbitral tribunal in the *South China Sea Arbitration* emphasised that "Article 298(1)(b) would not come into play if the other Party were later to begin employing its military in relation to the dispute in the course of proceedings."⁷

Concerning the question of whether the 'military activities' exception shall be invoked in the proceedings by the declaring State Party, the arbitral tribunal in the *South China Sea Arbitration* took the view that nothing suggests "that a provision of Article 298(1) must be specifically invoked"⁸ and that "absence of any mention of Article 298(1)(b) ... does

7. *South China Sea Arbitration* (n 2) para 1158.

8. *Ibid.*, para 1156.

not obviate the Tribunal's need to consider the applicability of this provision."⁹ It appears that this approach prevails for the moment.

In several parts, UNCLOS contains provisions regulating the passage of different types of ships through territorial seas, archipelagic waters, or international straits, a point noted by ITLOS in the case *Detention of three Ukrainian naval vessels*.¹⁰ Yet, there is no explicit definition of the terms 'military activities' or 'disputes concerning military activities' in the Convention.

Nevertheless, certain observations can be inferred from the text of Article 298(1)(b) of the Convention. It establishes a distinction between military and law enforcement activities, containing two separate clauses for disputes concerning military activities and for some disputes concerning law enforcement activities regarding the exercise of certain sovereign rights or jurisdiction related to fishing and marine scientific research and excluded from the jurisdiction of the court or tribunal under Article 297, paragraphs 2 and 3. This points toward distinct concepts of 'military activities' and 'law enforcement activities'. The *Virginia Commentary* notes that in Article 298(1)(b), the drafters of the Convention aimed to "distinguish between military activities and law enforcement activities."¹¹ In the view of the arbitral tribunal in the *South China Sea Arbitration*, the formulation of Article 298(1) "stands in stark contrast to the more optional formulation employed in Article 297(2) and 297(3), which provide that a State Party "shall not be obliged to accept the submission" of a dispute to compulsory settlement."¹² This distinction between military activities and law enforcement activities has been recognised in the law of the sea practice, including by the ITLOS in the *Detention of three*

9. Id.

10. *Detention of three Ukrainian naval vessels* (n 1) 283.

11. Nordquist (et al.) (n 6).

12. *South China Sea Arbitration* (n 2) para 1156.

Ukrainian naval vessels case and by both Annex VII arbitral tribunals in the *Dispute Concerning Coastal State Rights in the Black Sea, Sea of Azov, and Kerch Strait*,¹³ and in the *Dispute concerning the detention of Ukrainian naval vessels and servicemen*.¹⁴

Also, Article 298(1)(b) refers to “disputes concerning military activities, including military activities by government vessels and aircraft engaged in non-commercial service.” It leads to at least two considerations. First, Article 298(1)(b) applies to ‘disputes concerning military activities’ and not to ‘military activities’ as such. Second, to be qualified as ‘military activities’ within the meaning of the above provision, activities need not necessarily be carried out by military vessels or aircraft but, instead, can equally be performed by “government vessels and aircraft engaged in non-commercial service.”

On the other hand, although ‘military activities’ and ‘law enforcement activities’ in Article 298(1)(b) seemed to require different treatment, it is not always easy to separate them in real-life situations, for instance, when naval assets are employed in law enforcement operations or when initial law enforcement activity escalates into a military confrontation. This point was well emphasised in the jurisprudence of ITLOS and arbitral tribunals. For instance, the Tribunal held that “the traditional distinction between naval vessels and law enforcement vessels in terms of their roles has become considerably blurred. ... it is not uncommon today for States to employ the two types of vessels collaboratively for diverse maritime tasks.”¹⁵ Likewise, the arbitral tribunal in *Dispute Concerning Coastal State Rights in the Black Sea, Sea of Azov, and Kerch Strait* stated that:

13. *Dispute concerning coastal state rights in the Black Sea, Sea of Azov, and Kerch Strait* (n 3) 335-338.

14. *Dispute concerning the detention of Ukrainian naval vessels and servicemen* (n 4) 122-125.

15. *Detention of three Ukrainian naval vessels* (n 1), 283, para 64.

there is no consistent State practice as to the scope of activities that are to be regarded as being exercised by ‘military’ vessels, aircraft, and personnel. Forces that some governments treat as civilian or law enforcement forces may be designated as military by others, even though they may undertake comparable tasks.¹⁶

Apparently, many States rely on their military forces for non-military functions, such as disaster relief or evacuations. The application of the ‘military activities’ exception, therefore, cannot be limited only to situations where warships, government vessels, or aircraft engaged in non-commercial service are involved. Considering recent developments in the organisation, support, and conduct of military operations, we can also easily envisage a situation when a dispute may concern military activities of a State carried out by private contractors.

In disputes concerning UNCLOS, the ‘military activities’ exception was invoked for the first time in the *South China Sea Arbitration*. Then, the question of what constitutes a military activity for jurisdictional purposes was further addressed in cases between Ukraine and the Russian Federation, in part instigated by the Russian illegal occupation of Ukrainian Crimea. It featured as a key objection to the jurisdiction in the case *Detention of three Ukrainian naval vessels*¹⁷ in the proceedings on provisional measures before the ITLOS and at the preliminary objections stage in the *Dispute concerning the detention of Ukrainian naval vessels and servicemen*¹⁸ before the Annex VII arbitral tribunal. Russia also invoked a declaration excluding disputes concerning ‘military activities’ as an argument against the jurisdiction of the Annex VII arbitral tribunal in the *Dispute Concerning Coastal State Rights in the Black Sea, Sea of Azov, and Kerch Strait*.¹⁹

16. *Dispute concerning coastal state rights in the Black Sea, Sea of Azov, and Kerch Strait* (n 3) para 335.

17. *Detention of three Ukrainian naval vessels* (n 1) 283.

18. *Dispute concerning the detention of Ukrainian naval vessels and servicemen* (n 4).

19. *Dispute concerning coastal state rights in the Black Sea, Sea of Azov, and Kerch Strait* (n 3).

As a result of these proceedings, a certain degree of clarity has been inserted into the interpretation and application of the 'military activities' exception, which could be elucidated by a more careful analysis of each case's developments.

3. The *South China Sea* arbitration

The Award on the Merits in the *South China Sea Arbitration* between the Philippines and China was the first international decision concerning the interpretation of the 'military activities' exception under Article 298(1) (b) of the Convention. The arbitral tribunal basically considered its application in two situations - construction activities of China at Mischief Reef and disruption of the rotation and resupply operation for personnel of the Philippines' armed forces stationed aboard BRP Sierra Madre and prevention of the Philippines' vessels from entering Second Thomas Shoal by a combination of vessels from China's Navy, Coast Guard, and other government agencies.²⁰

China did not invoke the military activities exception in its Position Paper of 7 December 2014.²¹

The Philippines argued that the decision to rely on the 'military activities' exception "is a matter of choice, both at the declaration stage and thereafter,"²² and a party to the proceedings "is not required to insist

20. *South China Sea Arbitration* (n 2) para 1123.

21. Position Paper of the Government of the People's Republic of China on the Matter of Jurisdiction in the South China Sea Arbitration Initiated by the Republic of the Philippines (7 December 2014), available at <https://www.fmprc.gov.cn/mfa_eng/zxxx_662805/t1217147.shtml>.

22. *South China Sea Arbitration* (n 2) para 1156.

on a jurisdiction exception covered by a declaration.”²³ In its view, the arbitral tribunal had no need to look further into the application of Article 298(1)(b) since this provision had not been specifically invoked by China in the course of the proceedings.²⁴

As noted above, the arbitral tribunal did not agree with the proposition that Article 298(1)(b) must be specifically invoked. It further stated that “once made, a declaration under Article 298(1) excludes the consent of the declaring State to a compulsory settlement with respect to the specified categories of disputes”²⁵ and that, pursuant to Article 299(1), a dispute excepted by this declaration may be submitted to the dispute settlement procedures only by agreement of the Parties to the dispute.²⁶

Before examining the application of the ‘military activities’ exception in particular situations, the arbitral tribunal in the *South China Sea Arbitration* made some conclusions on the operation of Article 298(1)(b). It noted that Article 298(1)(b) applies to ‘disputes concerning military activities’ and not to ‘military activities’ as such.²⁷ Accordingly, it considered the relevant question to be whether the dispute itself concerned military activities rather than whether a party had employed its military in some manner in relation to the dispute.

The Philippines noted that China had repeatedly said that the facilities at Mischief Reef were being built for civilian use,²⁸ in particular, recalling the statement of China’s President Xi Jinping that China did not intend to militarise the features. It argued that the arbitral

23. Id.

24. Id.

25. Id.

26. Id. See also Article 299(1) of the Convention.

27. *South China Sea Arbitration* (n 2) para 1158.

28. Ibid., para 1012.

tribunal should accept China's characterisation of its activities.²⁹ In other words, the 'military activities' exception should not apply when a party to the dispute does not describe its conduct as military – the notion that even if with a different outcome, would be repeated in subsequent proceedings involving consideration of the 'military activities' exception.

According to the Philippines, "the context [of the 'military activities' exception] requires that the nature and purpose of the activity be military, to the exclusion of other activities or purposes that are more than purely incidental."³⁰ The Philippines argued that this exception to jurisdiction did not cover mixed-use projects and situations in which a military unit had been used to protect other activities. It submitted that "the involvement of military personnel in construction or land reclamation activities does not necessarily mean that the purpose of the activities is military. The logistical capabilities of the armed forces are at times engaged for civilian purposes in different parts of the world."³¹

In determining whether Chinese activities at Mischief Reef were military, the arbitral tribunal took note "of China's repeated statements that its installations and island construction are intended to fulfil civilian purposes."³² As a result, it did not deem "activities to be military in nature when China itself has consistently resisted such classifications and affirmed the opposite at the highest level."³³ Thus, "as civilian activity ... the China's conduct falls outside the scope of Article 298(1)(b)"³⁴ and

29. *Ibid.*, paras 1012 and 1014.

30. *Ibid.*, para 1013.

31. *Id.*

32. *Ibid.*, para 1027.

33. *Ibid.*, para 1028.

34. *Id.*

the arbitral tribunal concluded that it had jurisdiction to consider the relevant Philippines Submission.³⁵

It seems that the arbitral tribunal in the *South China Sea Arbitration* accepted the characterisation of the relevant activities by one of the Parties to the dispute as a conclusive motive for its decision on the matter. At the same time, the arbitral tribunal itself did not look into the purpose of these activities, as suggested by the Philippines among other things. Thus, it could be argued that, in the view of the arbitral tribunal, claims by the party about civilian purposes of the activities when the navy or other military assets are involved obviate the military nature of these activities. Then, following the same logic, it could also be assumed that if a party to a dispute explicitly categorise a situation which gives rise to a dispute as military, the declaration on disputes concerning ‘military activities’, if made by that party, shall almost automatically exclude that dispute from compulsory dispute settlement procedures under the Convention. Yet, this approach, apparently, was not supported by ITLOS in the provisional measures case *Detention of three Ukrainian naval vessels*,³⁶ nor by the Annex VII arbitral tribunals in cases *Dispute Concerning Coastal State Rights in the Black Sea, Sea of Azov, and Kerch Strait*,³⁷ and *Dispute concerning the detention of Ukrainian naval vessels and servicemen*.³⁸

As far as the jurisdiction of the arbitral tribunal to consider aggravation or extension of the dispute between the Parties in connection with incidents around Second Thomas Shoal are concerned, the Philippines argued that China’s conduct “was largely carried out by CCG [China Coast Guard] and CMS vessels seeking to enforce China’s purported

35. Ibid., the Philippines Submission No. 12.

36. *Detention of three Ukrainian naval vessels* (n 1) 283.

37. *Dispute concerning coastal state rights in the Black Sea, Sea of Azov, and Kerch Strait* (n 3).

38. *Dispute concerning the detention of Ukrainian naval vessels and servicemen* (n 4).

'jurisdiction,' and ...where military vessels were used, they were used for civilian or law enforcement purposes."³⁹ Therefore, these activities were not military in nature and should instead be more appropriately considered law enforcement activities.⁴⁰

In this regard, the arbitral tribunal first considered whether the claim of aggravation remained dependent on an underlying dispute or constituted a distinct dispute to which the 'military activities' exception would be applicable. While noting that "the Philippines has never clearly identified the dispute that it considers to have been aggravated by China's actions..." the arbitral tribunal found that "China's actions in and around Second Thomas Shoal and its interaction with the Philippine military forces stationed there constitute a distinct matter, irrespective of their effect in potentially aggravating other disputes before the Tribunal."⁴¹ Therefore, the arbitral tribunal considered that it had to evaluate whether this dispute concerned military activities for the purposes of Article 298(1)(b).⁴²

The arbitral tribunal found that the essential facts at Second Thomas Shoal concerned the deployment of a detachment of the Philippines' armed forces that was engaged in a stand-off with a combination of ships from China's Navy, China's Coast Guard, and other government agencies. A reported presence of China's military vessels in the vicinity when Chinese Government vessels attempted to prevent the resupply and rotation of the Philippine troops was considered enough for the arbitral tribunal to conclude that this stand-off represented a "quintessentially military situation, involving the military forces of one side and a combination of military and paramilitary forces on the other, arrayed in oppo-

39. *South China Sea Arbitration* (n 2) para 1131.

40. *Id.*

41. *Ibid.*, para 1160.

42. *Id.*

sition to one another.”⁴³ Thus, the arbitral tribunal concluded that it did not have jurisdiction to consider the relevant Philippines Submissions.⁴⁴

It seems that the arbitral tribunal in the *South China Sea Arbitration* assumed that the mere presence of the navy might be enough to determine that a dispute concerns military activities. That is evident also from the statement of the arbitral tribunal that “as these facts fall well within the exception, the Tribunal does not consider it necessary to explore the outer bounds of what would or would not constitute military activities for the purposes of Article 298(1)(b).”⁴⁵ In fact, the arbitral tribunal did not respond to the proposition of the Philippines to take into account the purpose of using military vessels when they were deployed in a situation that gave rise to the dispute. This approach appears not in full concurrence with the earlier findings of the arbitral tribunal, which stated that the relevant question was “whether the dispute itself concerns military activities, rather than whether a party had employed its military in some manner in relation to the dispute”.⁴⁶ It could be argued that the arbitral tribunal, in practice, leaned towards the arguments on the presence or deployment of military assets instead of examining whether the *dispute* concerned military activities.

The Award in the *South China Sea Arbitration* offered some basis for understanding how the ‘military activities’ exception might be interpreted and applied in particular circumstances. The arbitral tribunal’s conclusion that Article 298(1)(b) applies to disputes concerning military activities and not to military activities as such has found its proper reflection in subsequent practice. At the same time, its consideration of specific situations that gave rise to the dispute between the Parties did

43. *South China Sea Arbitration* (n 2) para 1161.

44. *Ibid.*, the Philippine Submissions No. 14(a) to (c).

45. *Ibid.*, para 1161.

46. *Ibid.*, para 1158.

not always receive a positive assessment from commentators. Some of the authors were even prompted to point out conflicting interpretations and applications of Article 298(1)(b) by the arbitral tribunal, when, on the one hand, it “treated China’s land reclamation activities as civilian projects even though they “involve military personnel,” but, on the other, deemed “the involvement of the military forces” as “a quintessentially military situation” when the Philippines provided resupply to its stationed military personnel at Second Thomas Shoal.”⁴⁷

The arbitral tribunal considered the characterisation by a state of its activities as military or civilian in nature and the presence of military vessels as, to some extent, consequential for the conclusion if the dispute concerns military activities. The following chapters will, *inter alia*, analyse whether these criteria attained the same importance in the subsequent proceedings under UNCLOS, where the ‘military activities’ exception was invoked.

4. ITLOS Order on provisional measures in case *Detention of Three Ukrainian Naval Vessels*

The next important decision in the context of the application of the ‘military activities’ exception was delivered by ITLOS on 25 May 2019, in provisional measures proceedings in the *Detention of three Ukrainian naval vessels* case.⁴⁸

47. Keyuan Zou and Qiang Ye, ‘Interpretation and Application of Article 298 of the Law of the Sea Convention in Recent Annex VII Arbitrations: An Appraisal’ (2017) *Ocean Development and International Law*, Vol. 48, 340; and Rob McLaughlin (et al.), ‘Maritime Law Enforcement and the Aggravation of the South China Sea Dispute: Implications for Australia’ (2016) *Australian Year Book of International Law*, Vol. 34, 60–61.

48. *Detention of three Ukrainian naval vessels* (n 1) 283.

The case relates to an incident that took place in the Black Sea near the Kerch Strait, bordered by Ukraine (the coast of illegally occupied Ukrainian Crimea) and by the Russian Federation. On 25 November 2018, three Ukrainian naval vessels (the *Berdyansk*, the *Nikopol*, and the *Yani Kapu*) and their 24 servicemen were arrested and detained by authorities of the Russian Federation. The status of the Ukrainian two naval warships and auxiliary vessel, as well as the Ukrainian naval personnel, was not disputed.

Those vessels had departed from Odessa, in the Black Sea, in order to transit through the Kerch Strait to the port of Berdyansk in the Sea of Azov. As they approached the entrance to the Kerch Strait on the night of 24/25 November, they received radio communications from the Russian Coast Guard – a division of the Border Service of the Federal Security Service (FSB) – asserting that the Strait was closed. When the Ukrainian vessels proceeded to the strait on November 25, 2018, they were blocked by Russian Coast Guard vessels. The Ukrainian vessels were ordered to wait in the vicinity of an anchorage. After being held for approximately eight hours, they turned around and navigated away from the Kerch Strait, but were pursued by the Russian Coast Guard. During the pursuit, the Russian Coast Guard vessels used force against the Ukrainian naval vessels. Shots were fired at the *Berdyansk*, wounding three members of its crew and causing damage to the vessel. The tugboat was rammed twice by the Russian vessels. In the following course of events, three Ukrainian vessels and the servicemen on board were seized and detained by the Russian Coast Guard vessels.

The Russian Federation instituted criminal proceedings against the servicemen who were still in prison at the time of the case consideration in the Tribunal. It should be noted that the Memorandum, submitted by the Russian Federation, stated that:

on 26 and 27 November 2018, [the 24 Ukrainian servicemen] on board the vessels were formally apprehended under Article 91 of the Code of

Criminal Procedure of the Russian Federation as persons suspected of having committed a crime of aggravated illegal crossing of the State border of the Russian Federation (section 3 of Article 322 of the Criminal Code of the Russian Federation).⁴⁹

On 16 April 2019, Ukraine filed with the Tribunal a Request for the prescription of provisional measures under Article 290, paragraph 5, of the Convention. By the Statement of Claim dated 31 March 2019, Ukraine had previously instituted proceedings under Annex VII to the Convention against the Russian Federation in a dispute concerning "the immunity of three Ukrainian naval vessels and the twenty-four servicemen on board."

In a note verbal dated 30 April 2019, the Russian Federation stated that in its view:

the arbitral tribunal to be constituted under Annex VII of UNCLOS will not have jurisdiction, including *prima facie*, to rule on Ukraine's claim, in light of the reservations made by both the Russian Federation and Ukraine under Article 298 of UNCLOS stating, inter alia, that they do not accept the compulsory procedures provided for in section 2 of Part XV thereof entailing binding decisions for the consideration of disputes concerning military activities.⁵⁰

The Russian Federation decided "not to participate in the hearing". However, on 7 May 2019, it submitted to the Tribunal a Memorandum on the circumstances of case No. 26.⁵¹

On 25 May 2019, the Tribunal issued an Order on provisional measures and, for the first time, gave its interpretation of the scope and application of the 'military activities' exception clause.

49. "Memorandum of the Russian Federation regarding its position on the circumstances of the case No. 26" of 7 May 2019.

50. *Detention of three Ukrainian naval vessels* (n 1) 283, para 8.

51. "Memorandum of the Russian Federation regarding its position on the circumstances of the case No. 26" of 7 May 2019.

The question the Tribunal had to decide on was whether the dispute submitted to the Annex VII arbitral tribunal concerned military activities.⁵² While the Russian Federation argued favouring such categorisation, Ukraine contended that its claims were based on “Russia’s unlawful exercise of jurisdiction in a law enforcement context.”⁵³

It should be noted that both Parties had made declarations in accordance with Article 298(1)(b), excluding disputes concerning military activities from the compulsory procedures.

The Russian Federation maintained that “the dispute submitted to the Annex VII arbitral tribunal concerns military activities” and was therefore excluded from the arbitral tribunal’s jurisdiction.⁵⁴ It specified that military personnel from the Russian Coast Guard arrested the three Ukrainian Military Vessels; the Coast Guard service was part of the Border Service, which operated under the FSB; the FSB was staffed by, inter alia, military personnel who perform military service in accordance with Russian legislation on military service.⁵⁵ Furthermore, it submitted that the Russian armed forces also participated in the operation: “the ‘Nikopol’ was stopped by the Ka52 combat helicopter of the Russian Ministry of Defence, and corvette ASW “Suzdalets” of the Black Sea Fleet was monitoring the Ukrainian Navy actions.”⁵⁶

In the view of the Russian Federation, the incident on 25 November 2018 was “a quintessentially military situation” as described in the *South China Sea Arbitration*, involving the military forces of one side and the other “arrayed in opposition to one another.”⁵⁷

52. *Detention of three Ukrainian naval vessels* (n 1) 283, para 63.

53. *Id.*

54. *Ibid.*, 283, para 50.

55. See: “Memorandum of the Russian Federation regarding its position on the circumstances of the case No. 26” of 7 May 2019, para 29(b).

56. *Id.*

57. *Detention of three Ukrainian naval vessels* (n 1) 283, par. 52.

In addition, the Russian Federation also contended that Ukraine, in statements made outside the confines of the claim, including before the UN Security Council and in formal communications with the Russian Federation, had repeatedly characterised the incident as concerning military activities.⁵⁸

On its part, Ukraine stated that Article 298 draws a clear distinction between military activities and law enforcement activities and that they are distinct, mutually exclusive categories.⁵⁹ In its view, the declarations on disputes concerning military activities under Article 298(1)(b) do not exclude the jurisdiction of the Annex VII arbitral tribunal since the current dispute between the Parties concerns law enforcement activities.⁶⁰

Ukraine basically advanced two reasons. First, with reference to the *South China Sea Arbitration*, it maintained that “the exception does not apply when the party whose actions are at issue has characterised them as non-military in nature.”⁶¹ According to Ukraine, Russia has characterised its arrest and detention of the Ukrainian vessels and imprisonment and prosecution of the servicemen as matters solely of domestic law enforcement.⁶²

Second, even setting aside Russia’s characterisation of the activity, Ukraine argued that it did not claim a violation of the Convention based on activities that are military in type but, instead, alleged Russia’s unlawful exercise of jurisdiction in a law enforcement context.⁶³ In Ukraine’s view, a dispute does not concern military activities simply because it involves warships or because warships were present: “It is not the type

58. Ibid., 283, para 53.

59. Ibid., 283, para 55.

60. Ibid., 283, para 50.

61. Ibid., 283, para 56.

62. Id.

63. Ibid., 283, para 57.

of vessel, but rather the type of activity the vessel is engaged in, that matters.”⁶⁴ According to Ukraine, its warships were trying to leave the area, and the Russian Coast Guard was chasing them to arrest them for violating Russian domestic laws, a typical law enforcement encounter.⁶⁵ Ukraine emphasised that its warships “were not engaged with the Russian military” and that “they were not arrayed in opposition to one another,” and that neither the involvement of the Russian Navy in the incident nor the use of force alone converted a law enforcement activity into a military one.⁶⁶

ITLOS pointed out that “the distinction between military and law enforcement activities cannot be based solely on whether naval vessels or law enforcement vessels are employed in the activities in question,”⁶⁷ though it may be a relevant factor. Nor was the Tribunal ready to base the distinction between law enforcement and military activities solely on Parties’ characterisation.⁶⁸ In the view of the Tribunal, the distinction “must be based primarily on an objective evaluation of the nature of the activities in question, taking into account the relevant circumstances in each case.”⁶⁹

The Tribunal concluded from the information and evidence presented by the Parties “that the underlying dispute leading to the arrest concerned the passage of the Ukrainian naval vessels through the Kerch Strait.”⁷⁰ In this respect, ITLOS observed that “it is difficult to state in general that the passage of naval ships *per se* amounts to a military activity.”⁷¹ It also

64. Ibid., 283, para 58.

65. Ibid., 283, para 59.

66. Ibid., 283, paras 59 and 60.

67. Ibid., 283, para 64.

68. Ibid., 283, para 65.

69. Ibid., 283, para 66.

70. Ibid., 283, para 68.

71. Id.

noted that “under the Convention, passage regimes, such as innocent or transit passage, apply to all ships.”⁷² Furthermore, in the view of the Tribunal, the specific cause of the incident that occurred on 25 November 2018 was the Russian Federation’s denial of the passage of the Ukrainian naval vessels through the Kerch Strait, based according to the Memorandum of 7 May 2019, on two grounds: the failure of the Ukrainian naval vessels to comply with the “relevant procedure in the 2015 Regulations” and the temporary suspension of the right of innocent passage for naval vessels because of “security concerns following a recent storm”.⁷³

As a result, the Tribunal found that “at the core of the dispute was the Parties’ differing interpretation of the regime of passage through the Kerch Strait”⁷⁴ and stated that “such a dispute is not military in nature.”⁷⁵

In addition, considering the context in which the Russian Federation used force when arresting the Ukrainian vessels and the sequence of events, the Tribunal held that “what occurred appears to be the use of force in the context of a law enforcement operation rather than a military operation.”⁷⁶

The view on the law enforcement nature of the activities of the Russian Federation was further supported by reference to the charges against the Ukrainian servicemen of unlawfully crossing the Russian State border and to the Russian Federation’s invocation of Article 30 of the Convention, entitled “Noncompliance by warships with the laws and regulations of the coastal State”, to justify its detention of the vessels.⁷⁷

72. *Id.*

73. *Ibid.*, 283, para 71; and the Memorandum of 7 May 2019.

74. *Detention of three Ukrainian naval vessels* (n 1) 283, para 72.

75. *Ibid.*, 283, para 72.

76. *Ibid.*, 283, at para 74.

77. *Ibid.*, 283, at para 76.

Therefore, three factors appeared crucial for interpreting the ‘military activities’ exception and its application in the particular situation based on the Order of the ITLOS in this case.

First, neither the type of vessels involved nor the categorisation of the dispute by the Parties is conclusive for distinguishing military activities from law-enforcement activities.

Second, the context of the dispute is important for establishing the nature of the activities in question.

Third, when a dispute concerns a situation with the combined presence and/or participation of military and law enforcement assets, it shall be evaluated objectively, taking into account all relevant circumstances of the case.

It is also plausible to sense a difference in the approach of the Tribunal in the *Detention of three Ukrainian naval vessels* case with the position taken by the arbitral tribunal in the *South China Sea Arbitration*, particularly on the relevance of the type of vessels involved and the characterisation of the dispute by the Parties.

5. Dispute concerning coastal State rights in the Black Sea, Sea of Azov, and Kerch Strait

The ‘military exception’ clause was raised again before the arbitral tribunal under Annex VII to UNCLOS at the stage of preliminary objections in the case *Dispute Concerning Coastal State Rights in the Black Sea, Sea of Azov, and Kerch Strait*.⁷⁸

This arbitration was initiated by Ukraine on 16 September 2016 when it served the Russian Federation with a Notification and Statement of

78. *Dispute concerning coastal state rights in the Black Sea, Sea of Azov, and Kerch Strait* (n 3).

the Claim (dated 14 September 2016) regarding a “Dispute Concerning Coastal State Rights in the Black Sea, Sea of Azov, and Kerch Strait.”⁷⁹ On 19 February 2018, Ukraine submitted its Memorial to the arbitral tribunal, and on 21 May 2018, the Russian Federation filed preliminary objections (dated 19 May 2018), contesting the jurisdiction of the arbitral tribunal.⁸⁰ One of the arguments in this regard referred to the exception set out in Article 298(1)(b) because, in the view of the Russian Federation, the dispute in the case, *inter alia*, concerned military activities. Ukraine rejected the claim that the declarations under Article 298(1)(b) precluded the arbitral tribunal’s jurisdiction.⁸¹ In their pleadings, the Parties widely referred to the Award in the *South China Sea Arbitration* and at the hearing also to the ITLOS Order on provisional measures in the *Detention of three Ukrainian naval vessels* case, which was held in June 2019. The arbitral tribunal issued an Award on preliminary objections on 21 February 2020.

The Russian Federation contended that the arbitral tribunal in the *South China Sea Arbitration* had set a low standard for the application of Article 298(1)(b), which “can be triggered by the mere involvement of the military forces”.⁸² It also claimed that the mere presence of military vessels in the vicinity of the Chinese conduct complained of by the Philippines, which was not military in nature, was enough to make such conduct fall “well within the exception.”⁸³ On the other hand, in the view of the Russian Federation, the only reason the arbitral tribunal found that construction activities at the Spratly Islands were not military activities was due to China’s opposing classification.⁸⁴

79. Ibid., para 8.

80. Ibid., para 19.

81. Ibid., paras 300 – 301.

82. Ibid., para 308.

83. Id.

84. Ibid., para 309.

According to the Russian Federation, the ordinary meaning of the term ‘military activities’ is “simply any activity conducted by the armed forces of a State or paramilitary forces.”⁸⁵ It argued that “the central thrust of Ukraine’s claim is the alleged involvement of the Russian military forces in Crimea, and all the specific claims concern, [...] military activities.”⁸⁶ In addition, the Russian Federation maintained that the specific conduct complained of by Ukraine was military in nature, such as the usurpation by the Russian Federation through “physical force” of gas fields and fisheries appertaining to Ukraine;⁸⁷ unlawful interferences with Ukrainian-flagged vessels and fixed platforms “by armed Russian [Federation] FSB guards” that had threatened Ukrainian vessels and the seizure and occupation by the Russian Federation military of Ukrainian offshore platforms;⁸⁸ and the Russian Federation military interference with Ukraine’s attempts to protect archaeological and historical objects in Ukraine’s maritime areas.⁸⁹

The Russian Federation stressed that it did not consent to the mandatory dispute settlement under the Convention with respect to disputes concerning military activities⁹⁰ and pointed out that, unlike China in the *South China Sea Arbitration*, it had specifically availed itself of the Article 298(1)(b) exception.⁹¹

Ukraine argued that the ordinary meaning of the term ‘concerning’ in Article 298(1)(b) is ‘about’ or ‘in reference to’ and, therefore, the military activities exception should only apply where the specific conduct

85. Ibid., para 306.

86. Ibid., para 304.

87. Ibid., submissions (a), (b), (f), and (g).

88. Ibid., submissions (d), (e), (h), and (i).

89. Ibid., para 311, and submissions (q) and (r).

90. Ibid., para 310.

91. Ibid., para 313.

complained of is military in nature.”⁹² In its view, this reading of Article 298(1)(b) was also supported in the *South China Sea Arbitration*, which identified a military activity as “one involving a military interaction between the military forces of one side and those of the other,” however, in this case, none of the events described had involved “military forces arrayed against one another” and neither Party had “alleged that a military confrontation occurred in the waters at issue.”⁹³ Noting that the Russian Federation has denied engaging in military activities, Ukraine also asked the arbitral tribunal to follow the approach taken in the *South China Sea Arbitration*. In that case, the tribunal declined to classify activities as military when China consistently denied such classification.⁹⁴

Ukraine cautioned that a broad reading of Article 298(1)(b) would make the Convention inapplicable to a range of ‘potentially important’ disputes having armed conflict in the backdrop but not as the actual subject, resulting in situations where “once a State unlawfully uses force against another, “all subsequent violations [of the Convention] by that aggressor would be immunised.”⁹⁵

It recalled the finding of the arbitral tribunal in the *South China Sea Arbitration* that the application of Article 298(1)(b) depended on whether “the dispute itself concerns military activities, rather than whether a party has employed its military in some manner in relation to the dispute,” and therefore the mere presence of armed Russian personnel and governmental vessels did not imply that the present dispute concerned ‘military activities.’⁹⁶ Further referring to the ITLOS Order in the *Detention of three Ukrainian naval vessels* case, where the Tribunal looked to

92. Ibid., para 316.

93. Ibid., para 325.

94. Ibid., para 319.

95. Ibid., para 318.

96. Ibid., paras 320, and 323-324.

“the immediate context in the circumstances of that case and concluded that the activity was not military, despite some involvement of military vessels”,⁹⁷ Ukraine argued that “it is the object of the activities in dispute that must be considered”.⁹⁸

The arbitral tribunal started with the analysis of the term ‘concerning’, employed in Article 298(1)(b). In its view, compared to other terms, such as ‘arising out of’, ‘arising from’, or ‘involving’, used elsewhere in the Convention to characterise disputes, “which are open to a more expansive interpretation, the term ‘concerning’ circumscribes the military activities exception by limiting it to those disputes whose subject matter is military activities,”⁹⁹ and thus, a mere ‘causal’ or historical link between certain alleged military activities and the activities in dispute cannot be sufficient to bar jurisdiction under Article 298(1)(b).

Then, the arbitral tribunal noted that the military activities exception is not triggered simply because the conduct of the Russian Federation had its origins in, or occurred against the background of, a broader armed conflict.¹⁰⁰ Instead, the relevant question for the arbitral tribunal was whether certain specific acts subject to Ukraine’s complaints constituted military activities.¹⁰¹

In practice, the arbitral tribunal largely followed the approach of ITLOS, requiring “an objective evaluation of the nature of the activities in question, taking into account the relevant circumstances in each case.”¹⁰²

As in the ITLOS case, the arbitral tribunal held that the mere involvement or presence of military vessels, while it may be relevant, was not

97. *Ibid.*, para 320.

98. *Ibid.*, para 321.

99. *Ibid.*, para 330.

100. *Ibid.*, para 331.

101. *Id.*

102. *Ibid.*, 283, para 66.

conclusive in assessing whether a dispute concerned military activities.¹⁰³ The arbitral tribunal then reiterated that the 'military activities' exception might have been triggered if the dispute itself concerned military activities rather than whether a party had employed its military in some manner in relation to the dispute.¹⁰⁴

In this regard, the arbitral tribunal also reaffirmed the earlier finding of the ITLOS by noting that the "use of physical force is insufficient to conclude that an activity is military in nature."¹⁰⁵ It noted that law enforcement forces were generally authorised to use physical force without their activities being considered military. Thus, having examined the larger context of the events relating to the use of force by the Russian Federation in order to prevent Ukraine's access to and exploitation of hydrocarbon fields and fisheries, and taking into account that the Russian Federation had granted offshore hydrocarbon licences to civilian commercial companies and regulated the exploitation of fisheries resources under a civilian legal framework, the arbitral tribunal found that the use of force did not turn the dispute into one concerning military activities.¹⁰⁶ In its view, "such alleged force appears to have been directed towards maintaining civilian activities."¹⁰⁷

In the same manner, in the situations of detention and subsequent release of a captain of a Ukrainian fishing boat following the payment of a fine and the deployment of Russian armed guards on an oil platform, the arbitral tribunal did not classify these activities as military in nature.¹⁰⁸ Even though the Ukrainian vessels, whose navigation was impeded, be-

103. *Ibid.*, para 334.

104. *Id.*

105. *Ibid.*, para 336.

106. *Id.*

107. *Id.*

108. *Ibid.*, paras 337-338.

longed to the navy, the arbitral tribunal refused to agree that this caused the dispute to concern military activities.¹⁰⁹

Following the general approach that “the mere involvement of military vessels or personnel in an activity does not ipso facto render the activity military in nature,”¹¹⁰ the arbitral tribunal, despite the participation of the Russian Federation’s military in the archaeological expeditions in question, also did not find that the dispute regarding underwater cultural heritage concerned military activities.¹¹¹

To sum up, the arbitral tribunal in the *Dispute Concerning Coastal State Rights in the Black Sea, Sea of Azov, and Kerch Strait* case further diminished the implication of categorising the activities by the Parties and the type of vessels involved in determining whether the dispute concerned military activities. Instead, they emphasised the need of making an objective assessment of the nature of the activities in question.

6. Dispute concerning the detention of Ukrainian naval vessels and servicemen

As expected, the Russian Federation once again tried to argue for the application of the ‘military exception’ clause in the Annex VII arbitral tribunal in the *Dispute concerning the detention of Ukrainian naval vessels and servicemen* case. Again, the arbitral tribunal has dealt with the issue at the preliminary objections stage.¹¹²

109. Ibid., para 338.

110. Ibid., para 340.

111. Id.

112. *Dispute concerning the detention of Ukrainian naval vessels and servicemen* (n 4).

The Parties' arguments mostly coincided with those made in the ITLOS proceedings on provisional measures in the *Detention of three Ukrainian naval vessels* case,¹¹³ with extra attention to factual details. They also generally followed their approaches, expressed in the Annex VII arbitral tribunal in the *Dispute Concerning Coastal State Rights in the Black Sea, Sea of Azov, and Kerch Strait*.¹¹⁴

The Russian Federation once again submitted that the dispute concerned 'military activities', regardless of whether these activities could also be considered as 'law enforcement activities.' The Russian Federation argued that these activities fell outside the jurisdiction of the arbitral tribunal pursuant to the declaration made under Article 298(1)(b) of the Convention.¹¹⁵ It maintained that the expression 'disputes concerning military activities' was drafted in broad and unqualified terms encompassing any activities relating to the armed forces. Referring to the Order on Provisional Measures of ITLOS, it insisted that Article 298(1)(b) required an "objective evaluation of the relevant activities, and their nature, taking into account the relevant circumstances".¹¹⁶ In this regard, the Russian Federation claimed, however, that both terms 'activities' and 'concerning' being "inherently broad" should be interpreted with "no further qualification"¹¹⁷ and "no high threshold should be imposed" for activities to qualify as military activities for the purposes of the exclusion.¹¹⁸ Thus, in its view, the terms 'military', 'activities', and 'concerning' in Article 298(1)(b) encompass military activities that are not "exclusive-

113. *Detention of three Ukrainian naval vessels* (n 1) 283.

114. *Dispute concerning coastal state rights in the Black Sea, Sea of Azov, and Kerch Strait* (n 3).

115. *Dispute concerning coastal state rights in the Black Sea, Sea of Azov, and Kerch Strait* (n 3), Russian Federation's Preliminary Objections, 25.

116. *Detention of three Ukrainian naval vessels* (n 1) 283, para 66.

117. *Dispute concerning coastal state rights in the Black Sea, Sea of Azov, and Kerch Strait* (n 3), Russian Federation's Preliminary Objections, 30.

118. *Ibid.*, 34.

ly military” and may also be conducted for law enforcement or include such element.¹¹⁹

Turning to the dispute at issue, the Russian Federation emphasised that it concerned the activities which took place on 25 November 2018 in the Black Sea and the detention of Ukrainian military vessels and servicemen “formed part of and resulted directly from that incident”.¹²⁰ It also pointed to “relevant circumstances”, which, in its view, supported that “the events that are at the heart of the current dispute constitute military activities”.¹²¹ In particular, they include the presence of military personnel on both sides; the military nature of the three Ukrainian vessels that were detained, their armament with guns and artillery, some of which were operational; threat and actual use of force by the forces of the Russian Federation against the Ukrainian vessels and servicemen; the alleged conduct of the Russian military in response to “an illegal crossing of [its] State border by another State’s warships” and in “protecting its State national security interests given the unwarranted (armed) presence of the military of another State”.¹²² In fact, it attempted again to present these circumstances as replicating the criteria identified by the arbitral tribunal in the *South China Sea Arbitration* of a “quintessentially military situation” involving the military forces of one side and a combination of military and paramilitary forces on the other, arrayed in opposition to one another.

Ukraine’s position also mirrored its earlier approach. It maintained that this dispute concerned the lawfulness of the Russian Federation’s exercise of law enforcement jurisdiction rather than the lawfulness of

119. Ibid., 64; and Preliminary Objections Hearing, 14 October 2021, 309:2–309:10.

120. *Dispute concerning coastal state rights in the Black Sea, Sea of Azov, and Kerch Strait* (n 3), Russian Federation’s Preliminary Objections, 35–37.

121. Ibid., 35–54.

122. Ibid., 45; and Preliminary Objections Hearing, 11 October 2021, 43:23–44:11.

any military activities.¹²³ According to Ukraine, the use of the term 'law enforcement activities,' in Article 298(1)(b) specifically refers to juridical acts that are "fundamentally distinct" from military activities.¹²⁴ In its view, it was well-settled in the earlier jurisprudence of Annex VII arbitral tribunals and ITLOS that "a dispute 'concerns' military activities only when the specific subject matter of the dispute, *i.e.*, the basis for the applicant's legal claim, is a military activity; that the mere involvement of military (or coast guard) vessels does not trigger the exception; and that the acts of law enforcement, such as an attempted exercise of the right of hot pursuit, cannot be characterised as military activities."¹²⁵

Ukraine asserted that its submissions, in this case, advanced claims concerning violations of UNCLOS (*inter alia*, immunity violations) pertaining to the Russian Federation's boarding, arrest, detention, and prosecution of its naval vessels, which was the 'subject matter' of the dispute. At the same time, it had "advanced no claims about, and seeks no relief from, any other 'activities of the Ukrainian and Russian forces on 25 November 2018'."¹²⁶ It further pointed out that the dispute before the arbitral tribunal concerned the Russian's activities in "arresting, detaining, and prosecuting the Ukrainian naval vessels and servicemen, *after* those vessels 'gave up their mission to pass through the strait'", which the Russian Federation itself has consistently characterised as law enforcement activities.¹²⁷

Having examined the submissions of the Parties, it seems clear that they argued about the characterisation of the events on 25 Novem-

123. *Dispute concerning coastal state rights in the Black Sea, Sea of Azov, and Kerch Strait* (n 3), Ukraine's Observations, 14 *et seq.*; and Preliminary Objections Hearing, 12 October 2021, 142:14–145:17.

124. *Ibid.*, Ukraine's Observations, 50.

125. *Ibid.*, 6, and 17, 19.

126. *Ibid.*, 25.

127. *Ibid.*, 29 and 31 (emphasis in original).

ber 2018, the nature and subject of the dispute between them in this regard, as well as whether the interpretation of the ‘military exception clause’ requires exclusively military activities or allows for some breadth and encompasses activities of the military for law enforcement purposes.

The arbitral tribunal has concluded “that the dispute between the Parties under the first preliminary objection is over the meaning of the term ‘military activities’”.¹²⁸ It noted that the use of the term ‘military activities’ in Article 298(1)(b) has been the subject of comment in some cases, without a consensus emerging on the scope of the ‘military activities’ exception.¹²⁹ However, in the view of the arbitral tribunal, what emerges from the previous cases is “that there must be a close connection or relationship between the subject of the dispute and the military activities and that the activities must be military in nature in the sense that they are activities that would be undertaken by military vessels or by government vessels carrying out military functions.”¹³⁰

It appears that in the latter part of the findings, the arbitral tribunal hinted at its criteria for understanding the nature of military activities. Namely, first, that such activities should be undertaken by military or government vessels and, second, that the functions carried out by such vessels should be military.

Another important finding of the arbitral tribunal is that as the interactions between the Russian and Ukrainian vessels developed, their character changed. That was a consequence of the general conclusion that activities which “initially have a law enforcement character may become activities with a military character, and vice versa.”¹³¹ Such an approach

128. *Dispute concerning the detention of Ukrainian naval vessels and servicemen* (n 4) 105.

129. *Ibid.*, 107.

130. *Ibid.*, 108.

131. *Ibid.*, 121.

allowed the arbitral tribunal to divide the events which gave rise to the dispute in that case into three phases.¹³²

The first phase involved a confrontation between the militaries of the two States, where orders were given by one to the other that were ignored. There was alleged manoeuvring by the vessels of both States, either to block passage or to gain passage. There was a lengthy period of standoff between the two States, with the vessels of one surrounded by the vessels of the other, and in fact, the naval vessels of one State were challenging the naval vessels of another State. In order to find whether the confrontation between the vessels of the two States at this phase involved military activities within the meaning of Article 298(1)(b), the arbitral tribunal has also considered several other events, statements and subsequent developments.

In its view, the Ukrainian vessels were engaged in a military mission – to redeploy from one port in Ukraine to another Ukrainian port located in the Sea of Azov, with instructions to “sail covertly, beyond the coastal and sea areas of observation of the Black Sea Fleet of the Russian Federation and Border Service of the Federal Security Service of the Russian Federation”.¹³³ It concluded that these instructions indicated that it was a military mission.¹³⁴ The vessels’ constant contact with the Ukrainian Ministry of Defence and the presence of Security Service personnel on board were assessed as further factors suggesting that Ukraine viewed the movement of its vessels to the port of Berdyansk in the Sea of Azov as having a military character.¹³⁵ Also, the raising and lowering of guns by the Ukrainian navy vessel Berdyansk swayed the arbitral tribunal, that

132. Ibid., 122.

133. Checklist of the artillery gunboat Nikopol’s readiness to go to sea from 09:00 a.m. on 23.11.2018 to 06:00 pm on 25.11.2018.

134. *Dispute concerning the detention of Ukrainian naval vessels and servicemen* (n 4) 115.

135. Id.

the Ukrainian vessels perceived themselves as being in a confrontation with the naval vessels of the Russian Federation. In addition, the arbitral tribunal considered that Ukraine's actions immediately following the arrest of the vessels, when it brought the arrest to the attention of the United Nations Security Council on 26 November 2018, characterised the matter as an act of aggression.¹³⁶ The fact that Ukraine requested the detained servicemen to be treated as prisoners of war was a further indication to the arbitral tribunal that, at the time, Ukraine had approached the confrontation as a military standoff.¹³⁷ However, the arbitral tribunal specifically pointed out that "it is not suggesting that an estoppel against Ukraine arises from the words it used before the Security Council, or that Ukraine's words should be characterised as statements against interest. Ukraine's statements before the Security Council are simply an indication of how at that time Ukraine understood and characterised the events."¹³⁸

That the Russian Federation saw this as more than routine law enforcement and rather as a confrontation between two militaries was also inferred by the arbitral tribunal from the fact that the Russian coast guard vessels were joined by a naval vessel from the Russian Black Sea Fleet and military helicopters and that they were opposing the naval vessels of another State which contested Russia's claims in the area.¹³⁹

136. United Nations Security Council, 8410th meeting, 26 November 2018, S/PV.8410, pp. 10, 12.

137. *Dispute concerning the detention of Ukrainian naval vessels and servicemen* (n 4) 117. Both Parties extensively quoted the public statements, especially from the first weeks after the incident, which in their views had deviated from the positions adopted in the arbitral tribunal. Specifically, Ukraine pointed out the numerous official claims by the Russian Federation, that the arrest, detention, and prosecution of vessels and servicemen had been for the purpose of law enforcement. Russia, on its part, alleged that in the past on several occasions Ukraine had characterised the relevant acts as military.

138. Id.

139. Ibid., 118-119.

In light of the foregoing, the arbitral tribunal concluded that the actions of the Parties in the first phase were military activities over which it had no jurisdiction.¹⁴⁰

The arbitral tribunal established that the second phase started from the time that the Ukrainian vessels began to leave the anchorage area and were ordered to stop. It continued until the Ukrainian vessels were boarded and the vessels and their crews arrested. However, the arbitral tribunal could not definitively conclude when military activities ended. It, therefore, postponed that decision to the merits.¹⁴¹

In practice, the arbitral tribunal designated two possibilities: one that, when the Ukrainian vessels began to leave the territorial sea in order to return to Odessa, the actions of the Russian vessels took on a law enforcement character, at that point ending military activities; and, alternatively, that it was the boarding and arrest of the Ukrainian vessels that brought the confrontation between the vessels of the two States, and thus the military activities, to an end.¹⁴² The arbitral tribunal did not offer criteria to be applied at the merits to establish whether and when the activities of the Parties stopped being military, and it would be interesting to look into its consideration in this regard.

Finally, the third phase, according to the arbitral tribunal, commenced after the arrest of the Ukrainian vessels and involved the continued detention of the vessels and their crews and the prosecution of the Ukrainian servicemen, subjecting them to domestic law enforcement processes. It concluded that the Parties' actions in the third phase were not military activities; therefore, it had "jurisdiction over the events in this phase."¹⁴³

140. *Ibid.*, 125.

141. *Ibid.*, 123 and 125.

142. *Ibid.*, 123.

143. *Ibid.*, 124 and 125.

In general, the arbitral tribunal further strengthened the approach, first expressed by ITLOS in its Order on provisional measures in the *Detention of three Ukrainian naval vessels* case that the determination of whether activities are military “must be based primarily on an objective evaluation of the nature of the activities in question, taking into account the relevant circumstances in each case”.¹⁴⁴ As stated by the arbitral tribunal, “that is the correct approach to take in determining whether the military activities exception to the Arbitral Tribunal’s jurisdiction can be invoked in this case.”¹⁴⁵ Accordingly, it looked at the events that occurred leading to the arrest and detention of the Ukrainian naval vessels and the prosecution of their crews, taking into account the events after the arrest. It is worth noting, however, that while dealing with the matter and in the operative part of the judgement (dispositive),¹⁴⁶ the arbitral tribunal continued to allude to the ‘events’ in order not only to determine what constituted the ‘military activities’ and what did not, but also to settle what was “excluded from the jurisdiction”, without explicit reference in the jurisdictional context to the ‘dispute’ concerning military activities.

144. *Detention of three Ukrainian naval vessels* (n 1) 283, para 66.

145. *Dispute concerning the detention of Ukrainian naval vessels and servicemen* (n 4) 109.

146. Ibid., 208: “Article 298(1)(b) Objection. a. *Finds* that the events of 25 November 2018 until a point in time after the Ukrainian naval vessels left anchorage area No. 471 constitute “military activities” excluded from the jurisdiction of the Arbitral Tribunal in accordance with Article 298(1)(b) of the Convention; b. *Finds* that the events following the arrest of the Ukrainian naval vessels do not constitute “military activities” excluded from the jurisdiction of the Arbitral Tribunal in accordance with Article 298(1)(b) of the Convention; c. *Decides* that the determination of the precise point at which the events ceased to be “military activities” within the meaning of Article 298(1)(b) of the Convention shall be ruled upon in conjunction with the merits.”

7. Conclusion

The above-discussed jurisprudence appears to suggest some elements of a general understanding of the scope and application of the 'military activities' exception under Article 298(1)(b).

First, as stated in *the South China Sea Arbitration* and supported in other cases, Article 298(1)(b) applies to 'disputes concerning military activities' and not to 'military activities' as such.¹⁴⁷ Even though the arbitral tribunal in the most recent case (*Dispute concerning the detention of Ukrainian naval vessels and servicemen*), in the relevant concluding paragraphs and in the dispositive referred to the 'events',¹⁴⁸ the considerations reflected in the text of that judgement as a whole seem to support the preceding practice.

Second, to qualify as 'military activities' within the meaning of Article 298(1)(b), activities do not necessarily need to be carried out by military vessels and aircraft. Instead, they can equally be performed by "government vessels and aircraft engaged in non-commercial service."¹⁴⁹

Third, a decision on whether the 'military activities' exception excludes compulsory procedure under the Convention shall be made in the context of a specific dispute, taking into account the relevant circumstances of each case.¹⁵⁰ Additionally, in the situation when an incident which causes a dispute involves a combination of naval assets and law

147. *South China Sea Arbitration* (n 2) para 1158; *Detention of three Ukrainian naval vessels* (n 1) 283, para 63; *Dispute concerning coastal state rights in the Black Sea, Sea of Azov, and Kerch Strait* (n 3) 334.

148. *Dispute concerning the detention of Ukrainian naval vessels and servicemen* (n 4) 124, 125, and 208.

149. *Dispute concerning coastal state rights in the Black Sea, Sea of Azov, and Kerch Strait* (n 3), para 333.

150. *Detention of three Ukrainian naval vessels* (n 1) 283, para 66; *Dispute concerning the detention of Ukrainian naval vessels and servicemen* (n 4) 109.

enforcement or civilian vessels, one of the key questions for ITLOS or the Annex VII arbitral tribunal is how to distinguish military activities from other activities, in particular the law enforcement ones.

At the same time, these cases reveal some differences in the application of the ‘military activities’ exception, particularly on the significance of characterising the activities in question by the Parties to a dispute. The arbitral tribunal in the *South China Sea Arbitration* concluded that it would not “deem [Chinese] activities to be military in nature when China itself has consistently and officially resisted such classifications and affirmed the opposite at the highest levels.”¹⁵¹ Yet, ITLOS, noting that “such characterisation may be subjective and at variance with the actual conduct”,¹⁵² held that “the distinction between military and law enforcement activities [cannot] be based solely on the characterisation of the activities in question by the parties to a dispute.”¹⁵³

It is clear that the ‘military activities’ exception does not instantly preclude the compulsory procedures under the UNCLOS due to the mere presence or even participation of warships or other naval assets. It may be recalled that while the arbitral tribunal in the *South China Sea Arbitration* held that its jurisdiction was limited by the declaration under Article 298(1)(b) in a “quintessentially military situation,” where the Chinese government vessels attempted to prevent resupply and rotation of the Philippine troops, even though these vessels were not military and China’s military vessels were in the vicinity, the arbitral tribunal in the *Dispute Concerning Coastal State Rights in the Black Sea, Sea of Azov, and Kerch Strait* found that “the mere involvement of military vessels or personnel in an activity does not ipso facto render the activity military in nature.”¹⁵⁴

151. *South China Sea Arbitration* (n 2) para 938.

152. *Detention of three Ukrainian naval vessels* (n 1) 283, para 65.

153. *Id.*

154. *Dispute concerning coastal state rights in the Black Sea, Sea of Azov, and Kerch Strait* (n 3) para 340.

Likewise, the use of force, even by naval vessels, *per se* does not exclude compulsory procedures. ITLOS emphasised that the context in which such force was used is of particular relevance,¹⁵⁵ and the arbitral tribunal in *Dispute Concerning Coastal State Rights in the Black Sea, Sea of Azov, and Kerch Strait* held that the “alleged use of physical force is insufficient to conclude that an activity is military in nature. Law enforcement forces [...] are generally authorised to use physical force without their activities being considered military.”¹⁵⁶

As stated by ITLOS, “the distinction between military and law enforcement activities must be based primarily on an objective evaluation of the nature of the activities in question, taking into account the relevant circumstances in each case.”¹⁵⁷ That conclusion, in fact, was supported in *the Dispute Concerning Coastal State Rights in the Black Sea, Sea of Azov, and Kerch Strait* case,¹⁵⁸ where the arbitral tribunal had examined the larger context of the events relating to the use of the military assets before characterising those activities as civilian or law enforcement. Thus, although the type of vessels involved and the categorisation by the Parties to a dispute may be relevant, evaluation of the nature of activities in question appears to be essential for the conclusion on whether a dispute concerns military activities. This approach, while leaving open the exact definition of the ‘dispute concerning military activities’ allows flexibility to consider the whole combination of factors relevant to the case, including the intent and purpose in which the military assets have been employed, the context of the dispute, and other relevant circumstances.

155. *Detention of three Ukrainian naval vessels* (n 1) 283, para 73.

156. *Ibid.*, 336.

157. *Ibid.*, 283, at para 66.

158. *Dispute concerning coastal state rights in the Black Sea, Sea of Azov, and Kerch Strait* (n 3) paras 332, 336-338, and 340.

Maritime security in the age of infrastructure

■ Christian Bueger*

1. Rethinking maritime security¹

Security at sea is a long-standing concern, with quests over naval domination driving global politics, sea battles often being decisive moments in history, and global marine safety regulations developed at least since the 1912 Titanic disaster. Yet, ‘maritime security’ as a concept and agenda is a brainchild of the 1990s, when it was established as a novel way of thinking about security at sea. It was the oceanic version of the widening and deepening debate of the security concept,² reflecting the need to discuss other threats than military ones, and to incorporate a broader range of actors, including industries, communities, non-governmental organisations as well as malign non-state actors, ranging from smugglers

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2. Barry Buzan and Lene Hansen, *The Evolution of International Security Studies* (CUP, 2009).

and pirates to extremist violent groups.³

Since its early formulations, the maritime security agenda has substantially evolved.⁴ Issues such as maritime terrorism, piracy in the Strait of Malacca, off the coast of Somalia and in the Gulf of Guinea, sanction violations, illicit fishing, pollution, and smuggling of people and counterfeits have led to a substantial and extensive agenda. The expanse of the agenda is reflected in dedicated national and regional maritime security strategies, coordination structures, and operations at sea across the world.⁵ The UN General Assembly regularly reflects on maritime security trends in its annual resolution on oceans and the law of the sea; the UN Security Council has recurrently addressed maritime security issues, and several UN agencies, including the International Maritime Organization and the UN Office on Drugs and Crime, have developed dedicated programmes. As legal scholars have shown in the early 2010s the legal and institutional architecture that addresses maritime security had become complex and multi-faceted.⁶

With growing challenges in strategic areas, such as the South China Sea or Arctic, and the need for reconsidering state coercion and hostile actions, the maritime security debate in many ways has now also returned to inter-state issues.⁷ Trends, such as hybrid threats, grey zone

3. Sarah Percy, 'Maritime Security' in Alexandra Gheciu and William C Wohlforth (eds), *The Oxford Handbook of International Security* (OUP, 2018); and Christian Bueger and Timothy Edmunds, 'Beyond Seablindness: A New Agenda for Maritime Security Studies' (2017) 93 *International Affairs* 1293.

4. For a reconstruction of this evolution, see Christian Bueger and Timothy Edmunds, *Understanding Maritime Security* (OUP, 2024).

5. Bueger and Edmunds (n 3).

6. Natalie Klein, *Maritime Security and the Law of the Sea* (OUP, 2011); James Kraska and Raul Pedrozo, *International Maritime Security Law* (Martinus Nijhoff, 2013).

7. See Bueger and Edmunds (n 3). Christian Bueger and Jan Stockbruegger, 'Maritime Security and the Western Indian Ocean's Militarisation Dilemma' (2022) 31 *African Security Review* 195. Basil Germond, 'The Geopolitical Dimension of Maritime Security' (2015) 54 *Marine Policy* 137.

warfare, but also great power rivalry, reflected in new geo-political narratives, such as the Indo-Pacific, have implied that maritime security is increasingly thought of in terms of competitive military action, rather than the cooperative law enforcement at sea and global information sharing that characterised the 2000s and 2010s.

Across this evolution of the maritime security debate, however, an important additional trend has largely been under-appreciated and too little reflected upon: The substantial transformation of the ocean and maritime activity that have occurred in the past three decades have turned the sea into a site of dense national, regional and global infrastructure. Contemporary maritime security is situated in an age of ocean infrastructures.

In this age of infrastructure, which scholars have described as the ‘blue acceleration’⁸ and the ‘industrialization’ of the ocean,⁹ as well as the ‘urbanization’ of regional seas,¹⁰ our dependency on the sea is fundamentally being altered. With the growth of shipping activities and on demand supply chain management, national economies are deeply dependent and interwoven with what happens at sea. The *Evergreen* incident, which blocked the Suez Canal in 2021, was a powerful reflection point for this.¹¹ Most fossil fuel energy resources are extracted from or transported by the sea. The green energy transformation, required to tackle climate change, depends on the expansion of offshore green energy, whether that is wind

8. Jean-Baptiste Jouffray (et al.), ‘The Blue Acceleration: The Trajectory of Human Expansion into the Ocean’ (2020) *One Earth* 2 (1): 43–54.

9. Fernando S. Paolo (et al.), ‘Satellite Mapping Reveals Extensive Industrial Activity at Sea’ (2024) 625 *Nature* 85.

10. Nancy Couling and Carola Hein (eds), *The Urbanisation of the Sea. From Concepts and Analysis to Design* (nai010 publishers, 2020).

11. Jade Man-yin Lee, Eugene Yin-cheung Wong, ‘Suez Canal blockage: an analysis of legal impact, risks and liabilities to the global supply chain’ (2021) MATEC Web Conference 339, 01019.

and solar farms connected by regional underwater electricity grids, or new infrastructure like hydrogen pipelines or even energy islands. The digital age relies on the global underwater network of optic fibre cables through which almost all of today's global digital data and communication flows. Moreover, blue economy strategies, marine conservation efforts, maritime safety regulations also imply that the sea today is structured through all sorts of new spatial governance frameworks, including traffic separation schemes, marine protected areas, artificial reefs, search and rescue zones, and their related infrastructure.

It is no longer useful to consider the sea as an open, free, or even anarchic space. The ocean today is a dense industrialised infrastructure space, and this density will intensify in the coming years. The immediate consequence is that in the age of infrastructure, the sea is not just out *there*, but wherever we are, whatever we do, very much *here*. Our lives, economies, societies, and communication are entangled with the sea through infrastructure to a degree as never before in human history. Moreover, living in an age of infrastructures where dependency on the seas has fundamentally increased, life and security *at sea*, as well as sustainable development and societal and human security *on land*, become entangled in new ways. Yet, thinking through infrastructures also makes visible more clearly that the oceans are a multi-dimensional security space. They are linked to airspace and the satellites of the low orbit, the seabed hosts cables and pipelines, and the subsea data cables are de facto the backbone of what is known as the cyber domain.

Yet, in many ways, maritime security continues to be thought of and strategised in terms of freedom of navigation and the needs of the shipping and fishing industrial sectors. The primary objective of maritime security policies remains the facilitation of unrestricted global trade by ensuring the free flow of goods, while concurrently preventing illicit actors – be they pirates, smugglers, or other predators – from exploiting and threatening this unhindered circulation. Ideas of the ocean as

a global common ‘heritage of humankind’ that needs to be sustainably managed and its future secured, have only played a marginal role in the maritime security debate, considered, for example, in the debate on eco crimes.¹² With the sea becoming a global common ‘*infrastructure of humankind*’, more efforts are needed to consider what this means for security at sea.

These profound changes imply that we need to start rethinking the maritime security agenda as a form of critical maritime infrastructure protection. In this understanding, the primary goal of maritime security is to protect the ocean’s infrastructure from harm. Since most infrastructures cross jurisdictions this objective is by definition transnational.¹³ It hence requires regional and global cooperation between states and regional international organisations. Since infrastructures are often owned and operated by private entities, public-private coordination is vital, but also the diverse range of users of ocean infrastructure need to be considered in security policies.¹⁴

While not all of the consequences of this shift can be spelled out in this contribution, four strategic moves are vital and further elaborated on: 1) recognizing the spatial entanglement and multidimensional character of maritime security, 2) connecting maritime security to other security agendas and fields, such as energy security, cyber security, and disaster response, 3) recoupling maritime security and regional seas gov-

12. Ascensiòn García Ruiz, Nigel South and Avi Brisman, ‘Eco-Crimes and Ecocide at Sea: Toward a New Blue Criminology’ (2022) 66 *International Journal of Offender Therapy and Comparative Criminology* 407.

13. For an insightful discussion how the law of the sea and ocean politics are in principle transnational see Mann I, ‘Law and Politics from the Sea’ [2023] *International Theory* 1.

14. I take the notion of assembly from Elisabeth Mann Borgese, *The Oceanic Circle: Governing the Seas as a Global Resource* (United Nations University, 1998). For a discussion of the publics and communities raised by infrastructures, see Benedict Kingsbury and Nahuel Maisley, ‘Infrastructures and Laws: Publics and Publicness’ (2021) 17 *Annual Review of Law and Social Science* 353.

ernance, and 4) the need for working towards new global norms and institutions. Each is discussed in the following.

2. Thinking infrastructurally: The spatial entanglements of maritime security

Maritime security is most often approached in two ways: through a focus on the surface or through its connection to land. Yet, a focus on infrastructures, reveals that maritime security is part of and entangled in other spatial domains.¹⁵

When approached as a surface problem, the focus of maritime security is on the security and safety of transport and fishery vessels, as well as the complex set of infrastructures enabling them. This is the predominant understanding. Yet, it is regularly noted that maritime security closely intersects with the land. The most obvious case here is port infrastructures, which are the focus of counterterrorism and counter-smuggling policies. The land also matters in the discussion of root causes, where factors leading to maritime insecurity are seen in the marginalization of coastal populations, cultures of crime, or the lack of sustainable development.¹⁶

Yet, thinking infrastructurally reveals that there are five other spatial domains that need to be considered: above the sea there is airspace and the low orbit, while under the sea, the subsea and ocean floor are different spatial environments. Lastly, there is the cyber domain.

Airspace not only matters because maritime patrol aircraft provide the

15. See for the following Christian Bueger, 'Beyond Surface: The six spatial dimensions of maritime security' (2024) KIIMS Periscope, 11.1.2024, Korean Institute for Maritime Strategy.

16. Christian Bueger, 'Learning from Piracy: Future Challenges of Maritime Security Governance' (2015) *Global Affairs* 1(1): 33-42.

most effective means of surveilling the sea; islands, platforms, and vessels become accessible through the air. In counter-piracy, special forces flown in by helicopters allowed for rapid responses and recapturing vessels. Yet, as evidenced by hijacks off the coast of Yemen and recurrent drone attacks, the airspace is a source of insecurity, too. The growing satellite infrastructure of the low orbit today is important for navigation and communication in the high seas; they are also ever more important in surveilling the vastness of the oceans and for identifying illicit behaviour.¹⁷

Under the surface, not only fish crimes are committed, but criminals increasingly rely on submersibles for smuggling operations, known as the rise of narco-submarines.¹⁸ On the seabed, the vastness of infrastructures is perhaps most visible. Cables and pipelines have expanded substantially, and for a long time, they have been understood as objects that do not require protection.¹⁹ Yet, this has substantially changed with concerns over acts of sabotage on subsea data cables, and two major attacks that occurred in the Baltic Sea by still unknown perpetrators.

Finally, there is the cyber domain. Digitalization in the maritime transport sector for logistical and navigational purposes, the use of remote-control management of offshore infrastructures, but also the growing prospects for autonomously operating vessels for both civil and military purposes, make the cyber domain an integral part of the contemporary maritime security agenda.²⁰

17. Kevin St. Martin (et al.), 'Ocean Data Portals: Performing a New Infrastructure for Ocean Governance' (2019) 37 EPD: Society and Space 484; Saadia M. Pekkanen, Setsuko Aoki, John Mittleman, 'Small Satellites, Big Data: Uncovering the Invisible in Maritime Security' (2022) International Security, Volume 47, Number 2, Fall 2022, 177-216.

18. Javier Guerrero, *Narcosubmarines. Outlaw Innovation and Maritime Interdiction in the War on Drugs* (Palgrave Macmillan, 2020).

19. Christian Bueger and Tobias Liebetrau, 'Governing hidden infrastructure: The security politics of the global submarine data cable network' (2021) Contemporary Security Policy, 42(3), 391-413.

20. Mawuli Afenyo and Caesar LD, 'Maritime Cybersecurity Threats: Gaps and Directions for Future Research' (2023) 236 Ocean and Coastal Management 1.

In the age of infrastructure, maritime security needs to be thought through in such multiple spatial domains. As I argue in the next section, this also has implications for how maritime security relates to other security agendas and fields of research.

3. Integrating security agendas of infrastructure protection

Protecting critical maritime infrastructures is not only a concern of maritime security alone. Indeed, the interconnectedness of the maritime sector, as discussed above, and the importance of various infrastructures necessitate the integration and facilitation of synergies with other agendas and fields.

The expansion of security thinking in the 1990s has led to a growing diversity of security agendas and fields of research, many of which are directly relevant for infrastructure protection. This includes fields such as energy security, supply chain and transport security, homeland security, disaster studies, and cyber security.²¹ Each of these is driven by different

21. Each of these agendas is extensive, for overviews see James Brassett and Nick Vaughan-Williams, 'Security and the Performative Politics of Resilience: Critical Infrastructure Protection and Humanitarian Emergency Preparedness' (2015) 46 *Security Dialogue* 32; Claudia Aradau, 'Security That Matters: Critical Infrastructure and Objects of Protection' (2010) 41 *Security Dialogue* 491; Reidar Staupe-Delgado (et al.), 'A Discipline without a Name? Contrasting Three Fields Dealing with Hazards and Disaster' (2022) 70 *International Journal of Disaster Risk Reduction* 102751; Aleh Cherp and Jessica Jewell, 'The Three Perspectives on Energy Security : Intellectual History, Disciplinary Roots and the Potential for Integration' (2011) 3 *Current Opinion in Environmental Sustainability* 202; Lene Hansen and Helen Nissenbaum, 'Digital Disaster, Cyber Security, and the Copenhagen School' (2009) 53 *International Studies Quarterly* 1155; Jamie Collier, 'Cyber Security Assemblages: A Framework for Understanding the Dynamic and Contested Nature of Security Provision' (2018) 6 *Politics and Governance* 13.

disciplines and professions, with economists and engineers often taking the lead. They tend to be treated in discussions in specific security policies, strategies, and forums, and indeed also separate sub-disciplines and even journals, often separated from maritime security or the ocean governance agenda. A key challenge in the age of infrastructure is to find pathways to reconnect, integrate, and synthesize these protection agendas in new ways.

Characteristically, there is a tendency to consider security as a technical problem, and some of these agendas may struggle with how to incorporate and think about political and military action. Energy security debates, for instance, have been criticised for an overly technical focus.²² Most problematically, their focus is limited to terrestrial concerns, which implies a lack of appropriate understanding of the physicality of the seas and the legal structures that govern the oceans.²³ Legal constructs, such as the Exclusive Economic Zone, the continental shelf, the Area, the international strait, or the freedom to lay pipelines and cables, are of great importance for protecting maritime infrastructures. While maritime security is explicitly transnational in orientation, the other fields often favour methodological nationalism. Maritime security debates can hence contribute to a better understanding of the transnational nature of infrastructures.

Maritime security debates, however, can learn much from integrating technical expertise from other domains as well. Calculations of infrastructure dependencies, one finds, particularly in energy security, disaster studies, and homeland security research, provide measures of density and vulnerability. Engineering perspectives, prevalent in energy security,

22. E.g. the discussion on technification in Trine Villumsen Berling, Izabela Surwillo and Veronika Slakaityte, 'Energy Infrastructuring the Baltic Sea Region. Between Technification and Securitization', in *Technopolitics and the Making of Europe* (Routledge, 2023).

23. Christian Bueger and Tobias Liebetrau, 'Critical Maritime Infrastructure Protection: What's the Trouble?' (2023) 155 *Marine Policy* 105772.

transport security, and cyber security debates, are vital to understand how infrastructures can be secured and protected physically as well as digitally. All of this speaks to the importance of crossing disciplinary boundaries and fertilizing insights. Common denominators are the increasing co-location of infrastructures, but also the shared threat landscape.

With density growing, infrastructures are increasingly co-located in national and regional waters, and indeed many of them either cross underwater or even have dual purposes. Underwater electricity cables, for example, carry optical fibre, and are hence energy and cyber infrastructure at the same time. The security of wind farms is vital for energy security, yet at the same time, the expansion of offshore energy creates new hazards for marine transport.

The spectrum of threats to infrastructures stretches from natural disasters, multi-use conflicts and accidents – cable cuts by fishing vessels, accidents between wind farms and ships, or the impact of oil spills on wind farms – to different forms of how criminals can exploit infrastructure, to terrorism and state hostilities, such as acts of sabotage. This threat spectrum is in the meantime well understood²⁴ and implies working towards integrated policies, operational coordination across spatial domains, as well as common cross-shareholder information sharing structures. Maritime security on its own is here too limited in perspective, and conversations across disciplines and security agendas are required.

24. Christian Bueger and Tobias Liebetrau, 'Protecting Hidden Infrastructure: The Security Politics of the Global Submarine Data Cable Network' (2021) 42 *Contemporary Security Policy* 391; Bueger and Liebetrau (n 23); Christian Bueger and Timothy Edmunds, 'Maritime security and the wind: Exploring threats and risks to renewable energy infrastructures offshore' (2024) *Ocean Yearbook* 39.

4. Recoupling maritime security and regional seas

The expansion of infrastructure implies that many regional seas, paradigmatically the North Sea, are now regions characterised by dense infrastructural relations.²⁵ With the green energy transition, this density is about to increase. The expansion plans for offshore wind and solar farms, underwater electricity grids, artificial ‘energy’ islands are substantial and will continue to change the face of regional seas.²⁶

It has long been recognised that maritime security issues need to be managed in one way or another at the level of regional seas. A core element in the evolution of maritime security has been the advancement of informal regional security cooperation arrangements. These include: naval symposia, such as the Western Pacific Naval Symposium;²⁷ coast guard function forums, such as the Arctic Coast Guard Forum;²⁸ regional information sharing agreements known as ‘maritime domain awareness’ and implemented through organisations such as the Information Fusion Center of the FC Singapore;²⁹ and broader informal cooperation agreements, such as the Djibouti Code of Conduct³⁰ or the Yaoundé Code of

25. Andersen HW, ‘Changing Technology, Changing Commons: Freight, Fish, and Oil in the North Sea’ in Nil Disco and Eda Kranakis (eds), *Cosmopolitan Commons: Sharing Resources and Risks Across Borders* (MIT Press 2023).

26. Chiroasca A, Rusu L and Bleoju A, ‘Study on Wind Farms in the North Sea Area’ (2022) 8 *Energy Reports* 162. The Economist, ‘The North Sea Economy: Europe’s New Powerhouse’ [2023] *The Economist* 46.

27. Sea Power Centre - Australia, ‘The Western Pacific Naval Symposium’ [2006] *Semaphore* 1.

28. Østhagen A, ‘Coastguards in Peril: A Study of Arctic Defence Collaboration’ (2015) 15 *Defence Studies* 143.

29. Bueger C, ‘From Dusk to Dawn? Maritime Domain Awareness in Southeast Asia.’ (2015) 37 *Contemporary Southeast Asia: A Journal of International & Strategic Affairs* 157.

30. Menzel A, ‘Institutional Adoption and Maritime Crime Governance: The Djibouti Code of Conduct’ (2018) 14 *Journal of the Indian Ocean Region* 152.

Conduct.³¹ These informal security cooperation mechanisms have important roles to play in addressing infrastructure protection as well. They offer important bridges between continental regional organisations, such as the European Union or African Union, and can easily incorporate industry and other stakeholders. They, however, remain narrowly focused on maritime security, particularly piracy, and have not yet built effective bridges to blue economy and ocean health.³² Their informal character limits the way they can ensure compliance and accountability.

Yet, regional seas do have institutional frameworks for governing maritime space, which are often not considered in terms of security. Regional conventions under the UNEP regional seas programmes address regional maritime cooperation for marine safety, marine protection, and sustainable development of blue economies.³³ The majority of these instruments are legally binding and include provisions for information sharing or coast guard cooperation. While there were high expectations in the 1990s that regional seas conventions could incorporate security cooperation, this has not yet been achieved.³⁴ Nonetheless, at least some of them, such as the Barcelona Convention for the Mediterranean, have taken steps in this direction. The focus on infrastructures can provide new foundations

31. Yücel H, 'Sovereignty and Transnational Cooperation in the Gulf of Guinea: How a Network Approach Can Strengthen the Yaoundé Architecture' (2021) 4 *Scandinavian Journal of Military Studies* 146.

32. Bueger C and Mallin F, 'Blue Paradigms: Understanding the Intellectual Revolution in Global Ocean Politics' (2023) 99 *International Affairs* 1719 <<https://academic.oup.com/ia/article/99/4/1719/7198183>>.

33. Akiwumi P and Melvasalo T, 'UNEP' s Regional Seas Programme: Approach, Experience and Future Plans' (1998) 22 *Marine Policy* 229. United Nations Environment Programme (UNEP), *Contributions of Regional Seas Conventions and Action Plans to a Healthy Ocean* (United Nations Environment Programme (UNEP) 2022) <<https://www.unep.org/resources/report/contributions-regional-seas-conventions-and-action-plans-healthy-ocean>>.

34. Mann Borgese E, *The Oceanic Circle. Governing the Seas as a Global Resource* (United Nations University Press 1998). Kullenberg G, 'Regional Co-Development and Security: A Comprehensive Approach' (2002) 45 *Ocean & Coastal Management* 761.

for formalizing regional security cooperation and bridging the divide between the maritime security, blue economy, and ocean health agendas through regional seas conventions.

In integrating maritime security cooperation in regional seas conventions, however, caution is required, and the risk that these become overly militarised must be addressed. Protecting infrastructure is chiefly a responsibility of civilian and industrial sectors, with the military playing a supportive role.

5. Strengthening global norms and institutions

In 2023, the UN General Assembly “urged” all states:

in cooperation with the International Maritime Organization and other relevant international organizations and agencies, to improve the protection of offshore installations, submarine cables and pipelines and other critical infrastructure by adopting measures related to the prevention, reporting and investigation of acts of violence against such infrastructure, in accordance with international law, and by implementing such measures through national legislation to ensure proper and adequate enforcement.³⁵

The resolution also “encourages greater dialogue and cooperation among States and the relevant regional and global organizations [...] to promote the security of such critical infrastructure.”³⁶ It further “encourages

35. United Nations. Oceans and the law of the sea: oceans and the law of the sea. Resolution adopted by the General Assembly on 5 December 2023. United Nations General Assembly Document A/RES/78/69, 2023, para 147.

36. *Ibid.*, para 176.

the adoption by States of laws and regulations necessary to provide that [damages and interferences...] shall be a punishable offence”, and “further calls upon States to enforce such laws against ships flying their flag or a person subject to their jurisdiction, in accordance with international law”.³⁷

The several declaratory and operative paragraphs included in the 2023 resolution indicate that the international community is aware of the need to take maritime infrastructure protection seriously but also point out the need to address legal gaps and foster international cooperation.

In the age of infrastructure, the sea is a common resource on which all nations depend for their welfare and security. Addressing climate change will not only involve increasing the resilience of infrastructures, but also expanding offshore green energy infrastructure. Despite the challenges presented by the conflict in Ukraine or the United States-China rivalry, protecting infrastructure is in the common interest of all states. Whether the global norms and institutions developed for dealing with maritime space are apt to keep up with the new age of infrastructure requires, however, review.

The UN Convention on the Law of the Sea (UNCLOS) provides a shared foundation for maritime infrastructures. Negotiated in the 1970s and concluded in the 1980s, the UNCLOS provisions are, however, not only ambiguous in many respects but also lack consideration of contemporary infrastructure. For example, important questions such as the legal status of infrastructure in the high seas arise – e.g. who owns a cable in international waters?³⁸ can wind farms be built on the high seas?³⁹ Basic definitions in UNCLOS need to be re-thought, for instance concerning

37. Ibid., para 177.

38. Douglas R. Burnett, Robert C. Beckman and Tara M. Davenport (eds), *Submarine Cables: The Handbook of Law and Policy* (Martinus Nijhoff, 2014).

39. Ignacio Herrera Anchustegui and Violeta S. Radovich, ‘Wind Energy on the High Seas: Regulatory Challenges for a Science Fiction Future’ (2022) 15 *Energies* 9157.

the status of autonomous vessels⁴⁰ or floating wind and solar farms.⁴¹ This calls for a global discourse on how UNCLOS should be interpreted and whether new conventions are required to ensure critical maritime infrastructure protection.

Since UNCLOS is a peacetime treaty, related questions arise in terms of norms for naval warfare. It remains contested if and how contemporary maritime infrastructures are covered under the Geneva Conventions, if and how they are civilian or legitimate targets of war. The San Remo, and more recently the Newport manual for armed conflict at sea, only provide partial reconciliation here, and a continuing discourse is required.⁴²

On an institutional level, the question of whether the UN architecture is fit for the age of infrastructure needs to be addressed. While the UN General Assembly and the UN Security Council provide overall policy direction, they have not yet developed an integrated global maritime security framework. Several UN agencies are responsible for implementing maritime security programmes, such as the International Maritime Organization, the Food and Agricultural Organization, and the UN Office on Drugs and Crime. These agencies have begun to consider maritime infrastructure, particularly ports and shipping, as well as the protection of subsea data cables.⁴³ UN-Oceans, the coordinating entity for the seas,

40. Anna Petrig, 'Unmanned Vessels and the Multi-dimensional Concept of 'Ship' Under UNCLOS 1982', in Kristina Siig, Birgit Feldtmann and Fenella Mary Walsh Billing (eds), *The United Nations Convention on the Law of the Sea. A System of Regulation* (Routledge, 2024), 63.

41. Maria Madalena Das Neves, 'Offshore Renewable Energy and the Law of the Sea', in Elise Johanse, Signe Veierud Busch and Ingvild Ulrikke Jakobsen (eds), *The Law of the Sea and Climate Change Solutions and Constraints* (CUP, 2015).

42. See Letts, D 'The Law of the Sea and the Law of Naval Warfare: Comfortable Intersection or Irreconcilable Conflict?', in Feldtmann (n 40) 63.

43. This includes the work of the International Maritime Organization and the UN Office on Drugs and Crime's Global Maritime Crime Programme providing technical assistance for the implementation of the International Ship and Port Security Code. UNODC is also active in developing regional strategies for the protection of subsea data cables.

has not yet focused on security aspects. Coordinating bodies important in infrastructure development and protection, such as UN-Energy or the UN Office for Disaster Risk Reduction, do not pay substantial attention to the sea. This implies that neither classic maritime security nor maritime infrastructure protection is coordinated and integrated to a sufficient degree, which raises the question of who would lead on norm development for maritime infrastructure protection and should have the authority to implement programmes. Rethinking the UN architecture in those terms will be necessary.

6. Conclusion

The age of infrastructure means that our dependency on the sea is growing and our relation to the oceans is fundamentally altered. Regional seas become dense industrial or urbanised infrastructure environments; global interdependence is increasing; transport, energy, cyber, and environmental protection become sectors and issue areas that are closely interwoven. Infrastructure protection invites us to identify new avenues for rethinking security and cooperation at sea.

The maritime security agenda has not yet fully considered the implications of the age of infrastructure. To push forward this discussion, I have argued for four moves: 1) To recognize the different spatial domains that thinking infrastructurally reveals for maritime security; 2) To integrate the range of diversified security agendas that deal with maritime infrastructures; 3) To couple regional seas conventions with maritime security cooperation; 4) To identify which new norms are required and how the global ocean regime might be revised to accommodate maritime infrastructure protection. Each of these will require further research and development to think through the consequences of the age of infrastructure for security at sea.

Science, technology and the law of the sea: Reflections on a relationship of dependency and construction

■ Reece Lewis*

1. Introduction

An understanding of the interaction between the law of the sea and emerging technology and science is more important than ever.¹ In practice, these new technologies are becoming increasingly employed, and little wonder too: if there is a more effective and efficient way of doing something and if the technology permits this then why labour under traditional methods? We would be remiss if we answer with: “but the law

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1. See further, e.g., James Kraska and Young-Kil Park (eds), *Emerging Technology and the Law of the Sea* (CUP, 2022); Donald R. Rothwell, Alex G. Oude Elferink, Karen N. Scott and Tim Stephens, ‘Charting the Future for the Law of the Sea’, in Donald R. Rothwell, Alex G. Oude Elferink, Karen N. Scott and Tim Stephens (eds), *The Oxford Handbook of the Law of the Sea* (OUP, 2015) 888; Keyuan Zou and Anastasia Telesetsky, *Marine Scientific Research, New Marine Technologies and the Law of the Sea* (Brill, 2021); and Hilde Woker, Rozemarijn J. Roland Holst and Harriet Harden-Davies, ‘New Technology and the Protection of the Marine Environment’, in Rosemary Rayfuse, Aline Jaeckel, and Natalie Klein (eds), *Research Handbook on International Marine Environmental Law* (Edward Elgar, 2023).

insists so”. Why? Firstly, because the law (like science and technology) is not to be more or less revered than any other aspect of human endeavour and it ultimately ought to be employed to make our lives better, easier and more fruitful than frustrate the same. Secondly, because it is doubtful that the law insists upon frustrating technological evolution and its employment in the maritime domain, in any event.

It is commonly thought that the relationship between law and science resembles something of an unhappy marriage in which the partners are forced to collaborate with each other because whatever happens one of them, impacts upon the other – possibly, albeit begrudgingly. In other words, it is supposedly not a constructive relationship which would, in contrast, involve some element of alignment and realignment whenever divergence occurs. There seems to be the view that “the law needs to keep up with the latest science. And science can only go so far as the dusty old law permits.”² This view seems to somewhat flavour considerations of the impact that emerging maritime technology has on the law of the sea: a view, essentially, that “[t]he 1982 UN Convention on the Law of the Sea (hereinafter UNCLOS) is having to go along kicking and screaming with the new technology on the block”. However, in reality, the relationship is much more nuanced: this has been the case in the past, and there is no reason why it will not be in the future.

There are many examples of new technology challenging the traditional approaches to the law of the sea and of seemingly being difficult to shoehorn into the regulatory framework provided for by the UNCLOS.³

2. It is, in truth, an entirely fair view to hold and somewhat flavours the tone of the evidence considered by the UK House of Lords International Relations and Defence Committee’s inquiry, *UNCLOS: the law of the sea in the 21st century* (2022).

3. E.g., in relation to autonomous vessels, Alexandros Ntovas ‘Functional and Maritime Autonomous Surface Ships’ and Raul (Pete) Pedrozo, ‘Unmanned and Autonomous Warships and Military Aircraft’ in Kraska and Park (n 1); Natalie Klein, Douglas Guilfoyle, Md Saiful Karim and Rob McLaughlin, ‘Maritime Autonomous Vehicles: New Frontiers in the Law of the Sea’ (2020) 69(3) ICLQ 719; and Natalie Klein, Douglas Guilfoyle, Md Saiful Karim and Rob McLaughlin, ‘Written evidence (UNC0003) to the House of Lords UNCLOS Inquiry’, (2022).

An examination of how these innovations can be understood within the UNCLOS in the light of the definitional complexities of many of the terms used in the Convention is relatively well rehearsed in the scholarship of the law of the sea. Furthermore, a paper of this length cannot hope to address the entire suite of examples in which it is said a cleavage has arisen between the law of the sea on the one hand and new technologies, science and capabilities on the other.

As a result, this paper is concerned with the more general reflection on the relationship between the law and emerging technologies. It is concerned with examining the broader themes which underpin this relationship, and which characterise the way that the law of the sea continues to be challenged and ultimately shaped by new technology and science. To do so, Section 2 examines the way that what was once regarded as ‘emerging technologies’ considerably shaped the modern law of the sea. Having demonstrated that the law of the sea developed alongside new science and technological capabilities, Section 3 considers how this will continue to be the case in the future. In light of the lessons to be learned from past (Section 2), and from current and future (Section 3) interactions between the law of the sea and emerging science and technology, Section 4 concludes the paper with a reflection on the future prospects for the relationship: ultimately arguing not only that we can be optimistic that specific legal solutions will be found to specific challenges when new technologies enable the law of the sea to achieve its objectives more easily, but also that new technology is creating the conditions in which more innovative approaches to the law of the sea, in general, might now be considered to be more feasible than ever before.

2. The law of the sea and ‘emerging’ science and technology

The law of the sea has long been developed in tandem with advances in maritime technology. Developments in scientific knowledge about our ocean spaces and their resources have long influenced the law of the sea and even the UNCLOS itself is replete with references to (various iterations of) ‘the best available scientific evidence’.⁴

There are many examples of the inherent connection between science and technology and the law of the sea, but two are perhaps the most prominent and illustrative of the point. First, is the way that the law regulating the continental shelf evolved.⁵ Of course, the idea of being able to drill for natural resources (oil and gas) in the continental shelf of coastal states was once an ‘emerging technology’ and as soon as the riches of the continental shelf became technologically and economically available to states, this motivated them to make such riches exclusively enjoyable for them – President Truman, in his now famous Proclamation of 1945, declared that “the natural resources of the subsoil and seabed of the continental shelf beneath the high seas but contiguous to the coasts of the US as appertaining to the US, subject to its jurisdiction and control”.⁶

However, doing so involved a not insignificant recasting of what was then a ‘rigid’ approach taken to jurisdiction in the law of the

4. Hilde Woker, ‘The Concept of the “Best Available Science” in the UNCLOS’ presentation delivered at the 10th Biennial Advisory Board on the Law of the Sea (October 2023).

5. See further, Malcolm D. Evans and Reece Lewis, ‘Law of the Sea’, in Malcolm D. Evans (ed), *International Law* (OUP, 2024, forthcoming) Section V.A.; David A. Colson, ‘The Delimitation of the Outer Continental Shelf between Neighbouring States’ (2003) 97 AJIL 91; Bjarni M. Magnusson, *The Continental Shelf Beyond 200 Nautical Miles: Delineation, Delimitation and Dispute Settlement* (Brill, 2015); and Joanna Mossop, *The Continental Shelf beyond 200 Miles: Rights and Responsibilities* (OUP, 2016).

6. The Truman Proclamation (1945) available in: 1 *New Directions in the Law of the Sea* 106.

sea.⁷ A new functional zone focussed on resources – with its associated suite of coastal state rights and duties alongside the reciprocal rights and duties for other states – needed to be carved out from the traditional territorial seas/high seas dichotomy which had long characterised the law of the sea for centuries before.⁸

The question *then* was: to what extent? How far does the coastal state's exclusive enjoyment of a continental shelf extend beyond the baselines? Again 'emerging technology' would inform the law and, even more than that, the law tied itself to technological developments: even if the technical scientific language is absent from the legal provisions. Initially, the limit of the continental shelf was defined in Article 1 of the 1958 Continental Shelf Convention (1958 CSC) as being "the seabed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 metres or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas." In other words, as technology developed and enabled the resources of the continental shelf to be extracted further and further from the coast and deeper and deeper in the ocean, the coastal state would be entitled to exclusive enjoyment of the resources it found there.

It was little surprise then that this idea soon became unsatisfactory for a host of states, not only those concerned about the extension of coastal state jurisdiction into high seas areas, but also for those who themselves wanted to extend their continental shelf claims but could not satisfy

7. See further Robin R. Churchill, Vaughan Lowe and Amy Sander, *Law of the Sea* (Manchester University Press, 2023), Chapter 7.

8. For historical context, see Ram Prakash Anand, *Origin and Development of the Law of the Sea: History of International Law Revisited* (Martinus Nijhoff, 1983); Daniel Patrick O'Connell, *The International Law of the Sea, vol I* (Clarendon Press, 1982), Chapters 1 and 2; Tullio Treves, 'Historical Development of the Law of the Sea'; and Douglas Guilfoyle, 'The High Seas', in Rothwell, Oude Elferink, Scott and Stephens (n 1).

the so-called exploitability test in Article 1 of the 1958 CSC. The International Court of Justice (ICJ) in the *North Sea continental shelf cases* intimated that there *was* some objective limit to the continental shelf that was *not* based on exploitability and thus placing some restrictions to the extent of state claims, even if the technology permitted resource extraction.⁹ This is the now much debated idea that the continental shelf somehow represents the “natural prolongation” of the coastal state’s land mass into the sea. But again, for those states who (thanks to better – and emerging – sea-floor data retrieval technology) could not demonstrate “a natural prolongation” of their landmass into areas they wanted to claim as their continental shelf because it simply plummeted to the deep ocean floor, this was unsatisfactory.

Another test was needed and was finally adopted in the 1982 UNCLOS. This time, reference *was* made to a scientific understanding of the continental shelf. Article 76(1) provides that the continental shelf extends beyond the “territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles (nm) from the baselines from which the breadth of the territorial sea is measured”. Article 76(2)-(6) then sets out the rather complicated formula for establishing the “outer edge of the continental margin” beyond 200 nm. In sum, states may claim either (i) up to the point at which the depth of the sedimentary rock of the shelf is greater than 1 percent of the distance to the foot of the continental slope; or (ii) an additional 60 nm from the foot of the continental slope drawn by straight lines. But neither of these methods entitle states to claim beyond 350 nm or more than 100 nm from the depth of a 2,500-metre isobath.

For our purposes we need not get into the detail here: but what is important is that none of these *legal* tests would be possible without

9. *North Sea Continental Shelf, Judgment* [1969] ICJ Reports, p 3, [18].

a scientific understanding of the continental shelf and nor would the legal tests be satisfied without the availability of technology sufficient to calculate and test the depth, breadth and nature of the seabed and subsoil.

The second core example illustrating the interwoven relationship that scientific advances have had on developments in the law of the sea is the legal treatment of the deep seabed — the so-called ‘Area’ addressed in Part XI of the UNCLOS.¹⁰ This Area is defined in Article 1(1) UNCLOS as the “seabed and ocean floor and subsoil thereof beyond national jurisdiction”. Concerns regarding the extraction of the resources of the deep seabed are experiencing somewhat of a renaissance — again, because the latest scientific evidence is showing how diverse and rich life can be in the greatest depths of our ocean spaces (a space previously thought to be barren and largely lifeless).

But advances in technology have always been key to the creation of the legal regime of the Area. As Tanaka makes clear, “the exploration and exploitation of natural resources in the Area are a relatively new subject of the law of the sea which was prompted by scientific discovery of polymetallic nodules.”¹¹ States soon became keen to develop another *sui generis* legal regime that enabled the realisation of the economic benefits of what were fantastical estimates at the time of the wealth that was said to be at the bottom of the high seas. At the time of their discovery, much of this was hypothetical: the technology was not available to begin extracting these resources.¹² This did not, however, prevent developing states from being concerned that only the already wealthy states would

10. See further, e.g., Churchill, Lowe and Sander (n 7), chapter 12, generally; Michael Lodge, ‘The Deep Seabed’, in Rothwell, Oude Elferink, Scott and Stephens (n 1); Catherine Banet, *The Deep Seabed* (Brill, 2020) and David Kenneth Leary, *International Law and the Genetic Resources of the Deep Sea* (Martinus Nijhoff, 2006).

11. Yoshifumi Tanaka, *The International Law of the Sea* (CUP, 2023) 234.

12. See Churchill, Lowe and Sander (n 7) 414–415.

be able to extract and enjoy the benefits of these resources.¹³ A novel solution was proposed during the negotiations of the UNCLOS: regard the Area's resources as the 'common heritage of mankind'.¹⁴

The introduction of this concept resulted in further tortuous negotiations at UNCLOS III with the mainly developed states ultimately being unsatisfied with the original Part XI of the convention which envisaged a stronger role for an international agency to regulate activities and itself conduct activities on its own within the Area and to (re) distribute the proceeds to developing states. The result was that Part XI would need to be re-written before the UNCLOS would be ratified by the major developed nations. This was the effect of the (arguably misleadingly called) 1994 Implementation Agreement concerning Part XI of the UNCLOS. This essentially re-wrote Part XI of the UNCLOS, watered down the role of the International Seabed Authority (ISA) and constituted a 'rebalance' towards the interests of developing states.¹⁵ While other factors contributed to reaching this compromise, crucially it became increasingly thought (thanks to the then latest scientific evidence) that the early estimates of the wealth of the Area were very much overestimated.

Today, however, two fundamental changes threaten to upset this balance. Firstly, the technology is getting better and better, and the prospect of deep-sea mining is increasingly closer to reality. Secondly, the latest scientific estimates suggest that the Area *is* actually resource rich and now

13. See e.g., James Harrison, 'Resources of the International Seabed Area' in Elisa Morgera and Kati Kulovesi (eds), *Research Handbook on International Law and Natural Resources* (Edward Elgar, 2016) and the contributions in Erik J. Molenaar and Alex Oude Elferink (eds), *The International Legal Regime of Areas beyond National Jurisdiction: Current and Future Developments* (Brill, 2010).

14. Arvid Pardo, *The Common Heritage: Selected Papers on Oceans and World Order 1967–1974* (Malta University Press, 1975); and Rudiger Wolfrum 'The Principle of the Common Heritage of Mankind' (1983) 43 *ZaöRV* 312.

15. Churchill, Lowe and Sander (n 7) 451–455.

the global economy (with its emphasis on battery technology) demands and values the extraction of these polymetallic nodules.

It is little wonder, then, that on 9 July 2021, Nauru submitted a request to the ISA Council to develop regulations concerning the exploitation of the non-living resources of the deep seabed.¹⁶ It did so because Section 1(15) of the Annex to the 1994 Implementation Agreement concerning Part XI of the UNCLOS provides that the Council “shall elaborate and adopt ... rules, regulations and procedures based on the principles contained in sections 2, 5, 6, 7 and 8 of this Annex, as well as any additional rules, regulations and procedures necessary to facilitate the approval of plans of work for exploration or exploitation” and shall “complete the adoption of such rules, regulations and procedures within two years of the request”. And while the Council *has* developed three sets of rules, regulations, and procedures relating to the exploration of the Area, it still has not done so in relation to its exploitation, even after two years have passed since a formal request to do so was made. Even though the Council has recently proclaimed that it does *not* interpret Section 1(15) of the Annex to mean that it must simply approve a submitted plan of work for exploitation in the absence of regulation, this is not the only potential interpretation of that provision and there are, of course, those with an interest in challenging the Council’s approach.¹⁷

16. See Evans and Lewis (n 5) Section V.D., and House of Lords Inquiry Report (n 2) [278]–[290].

17. Council of the International Seabed Authority, ‘Decision of the Council of the International Seabed Authority relating to the understanding and application of section 1, paragraph 15, of the Annex to the Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea’ (21 July 2023) ISBA/28/C/25, available at <https://www.isa.org.jm/wp-content/uploads/2023/07/ISBA_28_C_25.pdf>. See further, A Sander and S Aughey, ‘Deep seabed mining: The critical juncture that we should all be talking about’ (2023) Essex Court Chambers, Climate Change Law, Current Perspectives series, available at <<https://essexcourt.com/publication/deep-seabed-mining-the-critical-juncture-that-we-should-all-be-talking-about-week-7-series-2/>>.

Again, the details of the regime of the Area are not important for present purposes but what *is*, is the extent to which the science, the best available data, and emerging technology have considerably shaped the law – albeit in a somewhat toing and froing manner.

This Section began with the claim that the relationship between the law of the sea and science and emerging technologies is, in reality, much more nuanced than the simple belief that these are two separate worlds which minimally interact and only do so to the extent that the one presents new challenges for the other. The above demonstrated that science had a major role in shaping several new functional zones of resource jurisdiction in the law of the sea and which are set out within the UNCLOS. The Section below now addresses the *future*.

3. Future Development of the Law of the Sea

Just as science and (what was then) “emerging technology” greatly influenced the development of the law of the sea, so too will it in the future – and, indeed, this is already happening. The question is: *how*?

A. *Opportunities for incorporation by interpretation*

Treaties can – and arguably should – be interpreted in ways that apply their concepts to new circumstances, and UNCLOS is no different.¹⁸ What matters is convergence. When there is convergence between the

18. See Jill Barrett and Richard Barnes (eds), *Law of the Sea: UNCLOS as a Living Treaty* (British Institute of International and Comparative Law, 2016) and Alan Boyle, ‘Further Development of the 1982 Convention on the Law of the Sea: Mechanisms for Change’, in Richard Barnes, David Freestone and David Ong, *The Law of the Sea: Progress and Prospects* (OUP, 2006).

law and emerging technology, we have seen the courts and states essentially ‘update’ the UNCLOS without needing to redraft the provisions themselves. Often, the objectives of the law of the sea can be more effectively achieved through emerging technologies. Emerging technologies can help facilitate the application of the existing law of the sea and help states to more efficiently fulfil their obligations under the UNCLOS.

For example, the ‘hot pursuit’ of a vessel that has committed an illegal act within the jurisdiction of the coastal state can *only* be pursued once a visual or auditory signal to stop has been given and then ignored.¹⁹ Although this once meant the pursuing vessel had to get physically close enough to the pursued vessel to either visually display a signal (such as through raising a nautical flag) or auditorily signal (such as through a megaphone) to stop, the Arbitral Tribunal in the *Arctic Sunrise Award* (2015) considered a message to stop over VHF radio (commonly and widely used by vessels nowadays) satisfied this requirement.²⁰ And so, it is possible for common sense interpretations (beyond a literal reading of the text of the UNCLOS) to be utilised and to incrementally align the Convention with modern practices. What mattered in this case was that the “new” technology was consistent with the objectives behind the law. Regarding a VHF radio message as an auditory signal to stop did not expand the ‘right of hot pursuit’ beyond its carefully crafted confines

19. See further, Reece Lewis, ‘The Doctrine of Constructive Presence and the Arctic Sunrise Award (2015): The Emergence of the “Scheme Theory”’ (2020) 51 ODIL 19; Craig H. Allen, ‘Doctrine of hot pursuit: A functional interpretation adaptable to emerging maritime law enforcement technologies and practices’ (1989) 20 ODIL 309; Bill Gilmore, ‘Hot Pursuit’ in Marc Weller (ed), *The Oxford Handbook of the Use of Force in International Law* (OUP, 2015) 897; Nicholas M. Poulantzas, *The Right of Hot Pursuit in International Law* (A. W. Stijhoff, 1969).

20. *The Arctic Sunrise Case (The Kingdom of the Netherlands v The Russian Federation)* (14 August 2015) Award on the Merits, PCA Case No 2014-02, [259]. See James Harrison, ‘Current Legal Developments, The Arctic Sunrise Arbitration (Netherlands v. Russia)’ (2016) 31 IJMCL 151.

within the UNCLOS, nor did it undermine the careful balance of the interests in the freedom of navigation on the one hand and coastal states security concerns on the other.

As we turn to the future, new technology can similarly provide opportunities for further compliance with the UNCLOS. This is particularly the case in controlling activities within coastal state's exclusive economic zones (EEZs). New technologies, including drones and maritime autonomous vessels can be employed by coastal states' maritime enforcement agencies and coast guards to monitor and review the activities of vessels in a potentially more expedient and efficient manner than crewed vessels. Of course, when it comes to inspection, boarding and interdiction, the need for a crew increases,²¹ but remote-controlled technology can provide expedient initial reconnaissance opportunities without the need for scrambling a crew and potentially putting them in danger unnecessarily.

Such remote technologies can also be used in the pursuit and arrest of vessels engaged in illicit activity. But the legal situation is slightly more complicated. However, to return to the example of the right of hot pursuit, just as new technology has been incorporated into the meaning of the 'signal to stop' in Article 111(4) of the UNCLOS, there seems to be no reason why it cannot similarly be incorporated into the criteria for the pursuit itself in Article 111(1). The pursuit of a vessel must be 'hot' and so any pauses by the pursuing authorities will no longer be regarded as a 'hot pursuit'. Remotely operated technology can clearly facilitate the hot pursuit of a vessel and be launched by the pursuing state's vessels to ensure that the pursuit remains 'hot'.

21. Vaughan Lowe and Antonios Tzanakopoulos, 'Ships, Visit and Search' Max Planck Encyclopedia of Public International Law [MPEPIL]; and see generally, Natalie Klein, *Maritime Security and the Law of the Sea* (OUP, 2011); Douglas Guilfoyle, *Shipping Interdiction and the Law of the Sea* (CUP, 2009); and Efthymios Papastavridis, *The Interception of Vessels on the High Seas, Contemporary Challenges to the Legal Order of the Oceans* (Hart, 2014).

However, Article 111(5) says that “[t]he right of hot pursuit may only be exercised by warships or military aircraft, or other ships or aircraft clearly marked and identifiable as being on government service and authorized to that effect”. As a result, the question, again, becomes whether the terms used in the UNCLOS can be updated to reflect modern technology. In this case it concerns the more complicated question whether drones and maritime autonomous vessels can be considered as ‘aircraft’ and ‘ships’.²² This question has come to dominate considerations of the use of maritime autonomous vessels, not only in the literature, but also in practice – such as the work of the International Maritime Organization (IMO) in developing a regulatory framework for Maritime Autonomous Surface Ships (MASS), with a Code being developed currently with an anticipated date of entry into force in 2028.²³

Nevertheless, in the absence of a reimagining of the definition of the terms ‘ship’ and ‘aircraft’ in the UNCLOS in general, a more contextual approach can be taken to these terms rather than a one size fits all meaning – and thereby efforts could avoid becoming laboured under considerations other than those pertinent to the present issue. In the context of hot pursuit, for example, so long as the autonomous vessel or drone is clearly marked and identifiable as being employed by a military vessel or by the coastguard, why shouldn’t these be used to pursue vessels? Put yourself in the position of the pursued vessel: it engages in illegal behaviour inside the coastal state’s jurisdiction; the coastal state orders it to stop (even via VHF Radio) and it continues to flee beyond the state’s jurisdiction; it is then pursued by the coastal state’s remote-control technology (whether that be by drone or autonomous vessel technology): who else would the crew reasonably think the vessel

22. Klein, Guilfoyle, Md Saiful Karim and McLaughlin (n 3).

23. House of Lords Inquiry Report (n 2) chapter 6; See, International Maritime Organization, ‘Autonomous shipping’ (IMO.org).

is being pursued by other than the coastal state's coast guard or military? Again, if what matters is convergence – that the new technology can help facilitate the application of the existing law and does not upset the balance of trade-offs behind it – then why shouldn't remote controlled technology be understood as ships and aircraft for the purposes of hot pursuit?

Space precludes a full exposition of the many examples in which the UNCLOS could through interpretation be 'updated' so as to incorporate advances in technology and science. But what the above has shown, nonetheless, is that innovative interpretation can incorporate new technologies and science when they can be used to assist the implementation of the UNCLOS without undermining the delicate balance of rights, duties, and interests that it represents.

As we look to the future, again it is possible to form the optimistic view that new technology can provide the means for further compliance with the UNCLOS. Coastal states now have available to them more effective and efficient tools to survey activities within their jurisdiction. For similar reasons, flag states equally have the means to improve monitoring and the review of activities on board vessels that fly their flag.²⁴ Technology is breaking down barriers put in place by traditional considerations such as distance. Environmental monitoring and knowledge of the impact of human activity at sea continue to develop and improve apace: it is little wonder that the new Biodiversity Beyond National Jurisdiction (BBNJ) Agreement incorporates environmental impact assessments into its regulatory regime, as do many regional fisheries management organisations (RFMOs). Again, the point being made here is that advances in technology can be increasingly incorporated into the existing UNCLOS

24. This relates to one of the more interesting and important conclusions of the Wilton Park Report on 'Human Rights Law at Sea' (2022), available at <<https://www.wiltonpark.org.uk/event/human-rights-law-at-sea/>>, concerning enhanced flag-state monitoring and enforcement of labour standards and human rights compliance.

framework and can be used by states to comply with their obligations more effectively and efficiently.

B. Needs must: practise

In truth, not all situations present such a harmonious picture. But that is not to say that these do not provide opportunities for the law of the sea to develop in ways that are increasingly responsive to changing behaviours that have been facilitated by emerging technologies. Much like science and advances in technology informed the formation of the UNCLOS (in a toing and froing fashion as outlined above), it can continue to do the same today. Quite simply, whenever the legal framework fails to keep pace with such developments, we have thus far seen a response whether that be through ingenious legal interpretation in the way described immediately above or through the development of new instruments, such as the new BBNJ Agreement or those adopted between states (such as those generated under the auspices of the IMO). In other words, practise ‘nudges’ the law to develop.

However, a more complicated situation arises if the emerging practice seems to conflict with a fundamental element of the UNCLOS framework. For instance, the zonal approach to jurisdiction at sea is one of the key aspects of the UNCLOS. This was one of the ways in which coastal states ensured that their interests in the security and defence of their waters and territory were incorporated into the legal framework.

Included in this are the coastal state’s concerns regarding survey activities and marine scientific research within its jurisdiction. Such activities are essentially reserved for the national authorities of the coastal state. Article 19 of the UNCLOS provides that a vessel undertaking survey and research activities within the territorial sea is not entitled to innocent passage, and the authorities of the state prevent such passage and interdict vessels engaged in illicit activity. Similarly, vessels undertaking

survey and research activities within straits will not be entitled to the right of innocent passage, nor will they be entitled to transit passage²⁵ in straits where this would otherwise be available. Likewise, within the EEZ, the coastal state has the exclusive right to undertake marine scientific research activities.²⁶

However, there is a real need for up-to-date bathymetric data to identify hazards to the safe navigation of vessels and for this information to be shared with others so that they too can avoid any dangers. National hydrographic offices provide this information (reflecting the exclusive rights to such activities in national waters), but there remain considerable areas of the seas including coastal waters, which remain unmapped. And even in areas of the sea that *have* been surveyed, this may have been conducted many years ago and not using the more accurate tools available today, geomorphological changes to the seabed can also occur, and new hazards can emerge or simply be missed in previous surveys.²⁷

From the perspective of the mariner, there is a real need to address this situation. The technology exists which permits the instantaneous and accurate collection of bathymetric data and for this to be shared with other seafarers. Crowdsourced bathymetry has been defined by the International Hydrographic Organization (IHO) as

the collection of depth measurements from vessels, using standard navigation instruments, while engaged in routine maritime operations. The information, adequately categorized with respect to quality, would be used to supplement the more rigorous and scientific bathymetric

25. UNCLOS, Article 40.

26. UNCLOS, Article 56(1)(b)(ii).

27. See further, Steven Geoffrey Keating, 'Artificial Intelligence to Facilitate Safe Navigation of Ships', in Kraska and Park (n 1).

coverage undertaken by hydrographic offices, industry, and researchers around the world.²⁸

Crowdsourced bathymetry can, therefore, make a considerable contribution to the safety of navigation. It is little surprise, then, that seafarers are taking matters into their own hands and, what's more, they may even be required to do so.²⁹ In two recent grounding instances concerning the *MV Costa Concordia* and the *Motor Tanker Pazifik*, the 'finders of fact' cite Article 5 of the 1972 Collision Regulations (COLREGS) to conclude that the master is under a duty to ensure the safe passage of the vessel and that this includes making use of *all* available means to avoid a collision.³⁰ One (entirely feasible) interpretation of this is that this includes making use of crowdsourced bathymetric data, when this is the best available data.³¹

Whether the 'citizen' collection and sharing of bathymetric data legally violates any provision of the UNCLOS is a penetrating but increasingly redundant question. States are seemingly waking up and recognising the need and benefits of such technology – the safety of navigation is in all coastal states and seafarers' interests, including economic and political interests. The result is that an increasing number of states now accept the collection and sharing of crowdsourced bathymetric data even in areas inside national jurisdiction. The United States, for example, permits this

28. Jennifer Jencks (et al.), 'A Commitment to Crowdsourced Bathymetry Citizen Sourced Data – help reveal the deep and share your data' (2021) IHO, available at <<https://ihr.iho.int/articles/a-commitment-to-crowdsourced-bathymetry-citizen-sourced-data-help-reveal-the-deep-and-share-your-data/>>.

29. Steven Geoffrey Keating, 'Crowdsourced Bathymetry' presentation delivered at the 10th Biennial Advisory Board on the Law of the Sea (October 2023).

30. See Investigation Report 241/18, Serious Marine Casualty: Grounding of the motor tanker Pazifik off Indonesia on 9 July 2018 (23 January 2020) German Federal Bureau of Maritime Casualty Investigation; and Costa Concordia, Marine casualty on January 13, 2012 Report on the safety technical investigation (2012) Italian Ministry of Infrastructure and Transport.

31. Keating (n 27).

in all of its waters, other states permit it in their waters but with the caveat that it be reviewed by their national Hydrographic Offices or by the IHO itself, and other states require prior approval.³²

Just like the situation concerning the autonomous vessels (with the IMO developing its ‘MASS Code’), practice is encouraging the development of novel practical and legal solutions to meet evolving requirements – needs must.

4. Conclusion: Future prospects for the relationship between the law of the sea and emerging science and technology

4.1 Themes of construction and evolution

Much of the discussion regarding the impact that new technology and science have on the law of the sea, comes to focus on specific issues, specific gaps and specific solutions to these: i.e., on the technical and interpretive ways to update the law of the sea in order to bridge the gap between emerging practices and the law. What this paper has sought to do is reflect more generally on the relationship between the law of the sea and emerging technology and advances in science. It has considered key themes in this relationship which have demonstrated how advances in technology have helped construct the law of the sea as it exists today.

These themes include: firstly, the idea that new technological capabilities of states and private actors combined with new information and emerging science concerning our ocean spaces, instigated the creation of

32. See ‘Acceptance of Crowdsourced Bathymetry Activities and Provision of Resultant Datasets in National Waters of Jurisdiction’ (2023) IHO, available at <https://iho.int/uploads/user/Inter-Regional%20Coordination/CSBWG/MISC/B-12_2023_EN_Acceptance_of_CSB_Data_in_NWJ_v7.0.pdf>.

(at the time) considerably novel legal approaches – even impacting foundational legal aspects such as jurisdiction at sea. Secondly, following the coming into force of the 1982 UNCLOS, emerging technology continues to change behaviour and practice at sea at an even more rapid pace. This is opening up new opportunities for the use and enjoyment of the sea and its resources. But this also presents new maritime security risks, such as new maritime technology which can be harnessed for illicit activity.

Thirdly, emerging technologies also seem to create regulatory challenges when it appears that the 1982 Convention cannot keep pace with change. Here, much depends on whether these changes can be retrofitted into the UNCLOS framework: through innovative and common-sense interpretation of the provisions of the Convention and the concepts contained within it, and also through new treaties, codes and other soft law innovations. As the above has shown, what matters is whether the innovation assists the implementation of the UNCLOS, such as providing new (more efficient and effective) means for states to fulfil their obligations under the Convention.

However, there are going to be innovations that simply cannot be retrofitted into the Convention's framework – even through ingenious interpretation – especially if that changing behaviour contrasts with an essential aspect of the Convention. Here, what seems to matter most is whether the new practice is, quite simply, much better than the old ones (such as providing for more efficient and safe passage) such that novel legal approaches are adopted because they are better than languishing behind with our current approaches. It remains within the gift of states to construct these new approaches when presented with opportunities to do so.

4.2 A sea-change of approach to the law

This section now turns to a further theme: how technology can and is beginning to enable a fundamental shift in approach to the law of the

sea. This is the idea that the law of the sea is beginning to embrace a more digital – in contrast to the more traditional analogue – approach to the governance of our ocean spaces: that there are now different emphases which no longer depend on concepts such as the physical or actual domination of the state over the sea or that the geographic peculiarities of the state dictate its maritime entitlement. After all, if the coastal state's entitlements over the sea can now be digitally or virtually rendered and thereby digitally frozen, then is it necessary for this to remain physically true? Much like how many international legal rules once relied upon physical approximations to emerge (e.g., that the premises of the diplomatic mission represented the land territory of the sending state, or ships as floating portions of the state's territory),³³ will many rules of the law of the sea similarly move away from physical to a virtual reality – something which may now be more technologically feasible?

The physical or actual control of the sea underpins the traditional approach to jurisdiction in the law of the sea. This is represented in the old adage that the 'land dominates the sea'. The territorial sea, for example, was traditionally based on the physical domination of the coastal state over the maritime belt of water immediate to its land territory. Hence, the extent of the coastal state over which the coastal state claimed territorial sovereignty was said to be based on the so-called cannon-shot rule (i.e., on how far the state's land-based domination might practically apply at sea): this was traditionally something approximate to 3 nautical miles out to sea, and this distance became the predominant approach among a number of states to the extent of the territorial sea until the codification attempts occurred in the Twentieth Century culminating in a fixed distance of 12 nautical miles from the coastal state's baselines in the 1982 UNCLOS.

Similarly, the underlying premise of entitlement to the continental shelf was the idea that it represented the physical extension of the coastal

33. See further Reece Lewis, *Legal Fictions in International Law* (Edward Elgar, 2021) 45–48.

state's land mass into and under the sea. Hence, in Article 76(1) of the UNCLOS, the continental shelf is described as representing the "natural prolongation of [the coastal state's] land territory". It is on this basis that the coastal state's entitlement to its continental shelf is considered to be inherent and, thus, need not be positively claimed — in contrast to the EEZ.³⁴ As explained above, over time, the extent of the continental shelf has come to rely on distance, and the idea that the continental shelf represents the "natural prolongation of the state's landmass" has now been somewhat rendered outdated.

This has recently been demonstrated in the *Nicaragua v Colombia case* (2023) before the ICJ, in which the predominance of considerations of distance over natural prolongation was at stake. Nicaragua claimed that it was entitled to extend its continental shelf beyond 200 nautical miles from its baselines but within a distance *less than* 200 nautical miles from the coast of Colombia. The ICJ disagreed, holding that "under customary international law, a state's entitlement to a continental shelf beyond 200 nautical miles from the baselines from which the breadth of its territorial sea is measured may *not* extend within 200 nautical miles from the baselines of another state".³⁵ In doing so, the ICJ has essentially clarified that the continental shelf is now predominantly based on distance — it is a 200 nautical mile zone of resource jurisdiction — and that states may *only* claim a continental shelf beyond 200 nautical miles where this does not extend into another state's distance-based entitlement.³⁶

Just as distance has come to be the predominant basis upon which the extent of maritime entitlements in the law of the sea is based (and

34. *North Sea Continental Shelf, Judgment*, [1969] ICJ Reports, p 3, [19], [39], and [43].

35. *Question of the Delimitation of the Continental Shelf between Nicaragua and Colombia beyond 200 Nautical Miles from the Nicaraguan Coast (Nicaragua v Colombia)*, Judgment of 13 July 2023, ICJ Reports, [79].

36. See further, Malcolm D. Evans and Nicholas A. Ioannides, 'A Commentary on the 2023 Nicaragua v Colombia case' (2023) EJIL:Talk!; and Evans and Lewis (n 5) Section V.A.

represents a significant shift from being based upon its physical/actual existence), it becomes easier to envision moving to a world in which entitlements can exist without attachment to physical reality. This is increasingly called for by states whose maritime entitlements are threatened by sea-level rise.³⁷ For example, the Pacific Island Forum (comprising 18 member states including Australia, New Zealand and many developing Pacific island-states such as Kiribati, Samoa and Vanuatu) issued its Declaration on Preserving Maritime Zones in the Face of Climate Change-related Sea-Level Rise in 2021. This declared “that that once having, in accordance with the Convention, established and notified our maritime zones to the Secretary-General of the United Nations, we intend to maintain these zones without reduction, notwithstanding climate change-related sea-level rise” and “that we do not intend to review and update the baselines and outer limits of our maritime zones as a consequence of climate change-related sea-level rise”.³⁸

There is growing support for the Pacific Island Forum’s interpretation of the UNCLOS and to fix baselines and maritime zones as they currently exist despite the regression of the physical geographical coastline of the state.³⁹ It remains to be seen whether the Pacific Island Forum’s interpretation will be more broadly adopted. However, the need to provide stability concerning the extent of state’s maritime entitlements is increasingly being recognised and increasingly being regarded as consist-

37. House of Lords Inquiry Report (n 2) chapter 4.

38. Pacific Islands Forum, ‘Declaration on Preserving Maritime Zones in the Face of Climate Change related Sea-Level Rise’, (6 August 2021), available at <<https://www.forumsec.org/2021/08/11/declaration-on-preserving-maritime-zones-in-the-face-of-climate-change-related-sea-level-rise/>>.

39. E.g., Ministry of Foreign Affairs of Japan, ‘Foreign Minister Hayashi’s Meeting with the Delegation of the Pacific Islands Forum’ (MOFA, 6 February 2023), available at <https://www.mofa.go.jp/press/release/press1e_000369.html>.

ent with the UNCLOS.⁴⁰ This very subject is under examination by the International Law Commission.⁴¹

The future will tell whether we will ultimately move to a world where technology rather than the land dominates the sea, whether geography can be essentially converted into points on a digital map and still generate maritime entitlement. Nonetheless, the calls for an essentially virtual maritime entitlement grow and one cannot help but observe that modern and emerging technology have created the conditions in which such calls can appear more feasible and realistic.

This, in a sense, typifies the way that emerging technology impacts the development of the law of the sea: it opens up new possibilities, challenges orthodoxies and (sometimes slowly, but surely) creates the conditions permissive for the adoption of novel legal approaches.

40. E.g., Frances Anggadi, 'What States Say and Do About Legal Stability and Maritime Zones, and Why it Matters' (2022) 71 ICLQ 767.

41. See further, International Law Commission, 'Sea-level rise in relation to international law', available at <https://legal.un.org/ilc/guide/8_9.shtml>.

Datafication and artificial intelligence in the South China Sea

■ *Emilie van den Hoven**

Abstract

Artificial Intelligence (AI) is a highly transformative technology. No international legal domain will remain untouched by its effects, including the international law of the sea. This contribution examines some of the ways changes could occur in the maritime domain due to the rapid advancement of data-driven practices and AI-powered applications. Using the South China Sea conflict as the main case study, and specifically China's role in that conflict, this contribution explores how datafication and AI are increasingly being used in maritime practices and shaping the debate around interpretations of legal norms in the maritime context. In this way, the ongoing tensions in the South China Sea provide concrete examples to explore the significant effects that datafication and advanced technologies like AI might have on so-called 'lawfare' practices and 'gray

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zone' capabilities that can influence the interpretations and practice of the international law of the sea more broadly, and customary international law in particular.

Keywords: South China Sea, International law of the sea, Datafication, Artificial intelligence, Gray-zone capabilities, Lawfare, Customary international law.

1. Introduction

In early 2021, ships registered to the People's Republic of China (hereinafter referred to as China/PRC) were detected off the coast of Oman – seemingly fishing for squid. While the Automatic Identification Systems (AIS) aboard these vessels showed a geolocation beyond Oman's 200 nautical mile Exclusive Economic Zone (EEZ), signals captured by commercial satellites and the rapid analysis of the satellites' data confirmed that the vessels were in fact operating within the Omani EEZ. This demonstrated that the Chinese vessels were acting in contravention of the exclusive fishing rights of the coastal State as protected under international law.¹

This is not the only case in which advanced digital technologies were used to detect, monitor, or conduct contentious maritime practices.²

1. 'Keeping tabs on China's murky maritime manoeuvres: America and its allies are using whizzy new tools to track China's military activity and illegal fishing' *The Economist* (15 August 2023), available at <<https://www.economist.com/china/2023/08/15/keeping-tabs-on-chinas-murky-maritime-manoevres>>.

2. Tom Matkov, 'Maritime Innovator: SynMax' (*Spire Maritime Blog*, 11 April 2023), available at <<https://spire.com/blog/maritime/maritime-innovator-synmax/>>.

Progressively, practices of datafication, applications of Artificial Intelligence (AI), sensor technology, satellite observation, and robotics for ocean surveillance are being deployed in the maritime domain. These advanced technological tools change what can be done and how we do it in the maritime context. As such, they have a potentially significant, yet underexplored, relation with international law of the sea. Taking the South China Sea conflict as its main case and focusing on China's role in it, this contribution explores how datafication and AI are increasingly used in practices relevant to the maritime domain.³ More specifically, it explores the relationship of these technologies to so-called 'lawfare' practices and 'gray zone' capabilities.⁴ If datafication and AI are leveraged in the pursuit of such strategies, this could have multifaceted implications for the maritime domain and (customary) international law of the sea. This development warrants our attention and should be further investigated.

To this end, the article is structured as follows: first, I provide a brief overview of the South China Sea and the conflict in Section 2. After that, in Section 3, a selection of datafication initiatives is discussed to illustrate the diversity and wealth of data available and to lay the groundwork for various concrete examples of AI-powered applications in the South China Sea, which I discuss in Section 4. In Section 5, I will explore how

3. See Kanupriya Kapoor, 'China warns against 'new Cold War' at ASEAN summit' (*Reuters*, 6 September 2023), available at <<https://www.reuters.com/world/asean-welcomes-world-leaders-china-us-rivalry-overshadows-region-2023-09-06/>>; and Richard Javad Heydarian, 'Will the South China Sea Spark the Next Global Conflict?' (*The Diplomat*, 1 June 2021), available at <<https://thediplomat.com/2021/05/will-the-south-china-sea-spark-the-next-global-conflict/>>.

4. While it is perhaps best known in the west as the South China Sea, it's also referred to as the West Philippine Sea or the East Sea by many who dispute China's claims over it, see e.g., Yves Bouquet, 'South China Sea or West Philippine Sea?' in *The Philippine Archipelago* (Springer Geography, 2017) 711. I will use "South China Sea" throughout, although this is not to be read as a recognition of China's claims.

these technologies relate to strategies of Chinese maritime lawfare and accompanying gray zone capabilities in the South China Sea. After that, a brief conclusion follows.

2. The South China Sea at a glance

Shortly after the release of the much-advertised Greta Gerwig film ‘Barbie’, in the summer of 2023, the film was banned in Vietnam.⁵ At the heart of the matter lay the so-called ‘9-dash line’ allegedly depicted on a map in the background of one of the film’s scenes. The line symbolizes the PRC’s contentious claim over large swathes of territory in the body of water that is commonly known as the South China Sea, which goes far beyond its own EEZ as recognised under UNCLOS and customary international law.⁶ While the banning of the film was perhaps the first time that some members of the general public heard about the contentious map, the move by Vietnam certainly did not come as a surprise to those familiar with the South China Sea conflict, described as a “flashpoint, with potentially serious global consequences”.⁷

For years, the 9-dash line has been a point of serious political contention and international legal argument, but the situation has argua-

5. ‘Vietnam bans Barbie film over disputed map of China’s South China Sea claims’ *The Guardian* (London, 3 July 2023), available at <<https://www.theguardian.com/world/2023/jul/03/vietnam-bans-barbie-film-over-disputed-map-of-chinas-south-china-sea-claims>>.

6. Aspects of the dispute were also the subject of an important international arbitration case, see *The South China Sea Arbitration (Republic of the Philippines v. People’s Republic of China)* Award of 12 July 2016 [2016] PCA Case No 2013-19, available at <<http://pcacases.com/web/sendAttach/2086>>.

7. ‘What is the South China Sea Dispute?’ (*BBC*, 7 July 2023), available at <<https://www.bbc.co.uk/news/world-asia-pacific-13748349>>.

bly escalated in recent times.⁸ Incidents and collisions in the contested waters are becoming increasingly frequent.⁹ Freedom of Navigation Operations (FONOPS) have been conducted in the region by numerous States to contest China's claims, only for the PRC to add another dash to its line in the summer of 2023.¹⁰ This new 10-dash line controversially encompasses Taiwan and includes the disputed Aksai-Chin plateau and Arunachal Pradesh as part of Chinese territory, which India in particular has vehemently protested through public and diplomatic channels, with other Southeast Asian nations quickly following suit.¹¹

However, although the dashes are perhaps one of the most infamous aspects of the conflict, it is by no means the only bone of contention

8. See e.g. Timothy McLaughlin, 'The Most Dangerous Conflict No One Is Talking About' *The Atlantic* (2 December 2023), available at <<https://www.theatlantic.com/international/archive/2023/12/south-china-sea-philippines-dispute-explained/676218/>>.

9. See for recent incidents between the Philippines and China e.g. Rebecca Ratcliffe, 'The Philippines summons Chinese ambassador after two South China Sea collisions' *The Guardian* (23 October 2023), available at <<https://www.theguardian.com/world/2023/oct/23/china-philippines-ships-boats-collision-south-china-sea-vessels-spratly-islands>>; 'Philippines accuses China of swarming reef in South China Sea' *BBC* (3 December 2023), available at <<https://www.bbc.co.uk/news/world-asia-67605630>>; and Rebecca Ratcliffe, 'Manila accuses Beijing of 'dangerous manoeuvres' in the South China Sea' *The Guardian* (5 March 2024), available at <<https://www.theguardian.com/world/2024/mar/05/south-china-sea-philippines-accuses-china-coastguard-of-reckless-action-after-collision>>.

10. Bamba Galang, 'PH rejects, protests China's expanded 10-dash line in South China Sea' *CNN Philippines* (31 August 2023), available at <<http://www.cnnphilippines.com/news/2023/8/31/ph-rejects-china-10-dash-line.html>>; Richard Javan Heydarian, 'China's ten-dash line ups the ante with the Philippines' *Asia Times* (1 September 2023), available at <<https://asiatimes.com/2023/09/chinas-ten-dash-line-ups-ante-with-the-philippines/>>.

11. Cliff Venzon, 'China's new map release infuriates Taiwan, India and maritime neighbours' *The Sydney Morning Herald* (2 September 2023), available at <<https://www.smh.com.au/world/asia/china-s-new-map-release-infuriates-taiwan-india-and-maritime-neighbours-20230902-p5e1h2.html>>.

playing out in the South China Sea.¹² This is not surprising considering its geospatial and geopolitical attributes. The South China Sea encompasses an area of around 1.4 million square miles and is about 1.5 times larger than the Mediterranean Sea.¹³ Right in the heart of Southeast Asia, it forms the crucial connection between the Indian and Pacific Oceans, and so is of huge regional and international relevance. It has been estimated that nearly a third of all global trade and roughly 50% of the world's oil and gas shipments pass through the sea every year.¹⁴ Nearly \$3.4 trillion in goods cross the Sea, in 2019 it held about 12% of the world's total fish catch, and according to various estimates it holds around 11 billion barrels of oil and 190 trillion cubic feet of natural gas reserves.¹⁵

In total, seven governments are currently directly involved as claimants in the disputes over the Sea – the PRC, the Philippines, Vietnam,

12. A related issue, outside of the scope of this article, is China's planned instalment a hundred underwater data centres in the South China Sea, see Jeremy Hsu, 'China's first underwater data centre is being installed' *New Scientist* (4 December 2023), available at <<https://www.newscientist.com/article/2405830-chinas-first-underwater-data-centre-is-being-installed>>; another crucial development outside of the scope of this contribution, concerns undersea internet cables, see e.g. Maurizio Geri, 'South China Sea drills conceal a secret war to control the internet' (*The Hill*, 5 March 2023), available at <<https://thehill.com/opinion/national-security/3983240-south-china-sea-drills-conceal-a-secret-war-to-control-the-internet/>>.

13. Orde Kittrie, 'Chinese Lawfare in the Maritime, Aviation, and Information Technology Domains' (2023) available at SSRN, available at <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4515674>.

14. Stephen Cody, 'Dark Law on the South China Sea' (2022) 23 (1) *Chicago Journal of International Law* 65-66

15. Benjamin Sacks, 'The Political Geography of the South China Sea Disputes: A RAND Research Primer' (Rand Corporation, Santa Monica October 2022) 3, available at <<https://www.rand.org/pubs/perspectives/PEA2021-1.html>>; Kittrie (n 13) 7; Anders Corr (ed), *Great Powers, Grand Strategies: The New Game in the South China Sea* (Naval Institute Press 2018) 292; see also e.g. U.S. Geological Survey, *Assessment of Undiscovered Oil and Gas Resources of South East Asia, 2010* (2010) [Fact Sheet].

Taiwan, Malaysia, Brunei, and Indonesia.¹⁶ Other non-claimants, such as Japan, Australia, the United States, as well as other Association of Southeast Asian Nations (ASEAN) nations, and increasingly also the United Kingdom and the European Union, are progressively committed to maintaining existing international law on maritime entitlements and to balancing military and strategic political power in the region.¹⁷ The wealth of natural resources that the South China Sea harbours and its global economic and commercial importance, in addition to its historical importance as comprising territory of several states, have given rise to multiple different layers of disputes.¹⁸ In his 2023 book *China's Law of the Sea: The New Rules of Maritime Order*, Isaac Kardon identifies and analyses the disputes as divided into four analytically separate categories: (1) geographic rules; (2) resource rules; (3) navigation rules; and (4) dispute resolution rules.¹⁹ Each of these categories is an arena of contestation between China and some of its maritime neighbours, the United States, and other countries.²⁰

All parties involved, but perhaps in particular the PRC and the United States, are rapidly ramping up their technological capabilities at sea in response to the rising tensions.²¹ This trend is expected to persist in

16. Ben Dolven, Caitlin Campbell, and Ronald O'Rourke, 'China Primer: South China Sea Disputes' (21 August 2023) *Congressional Research Service Report* [IF10607] 1

17. Andrew Chubb, 'Dynamics of Assertiveness in the South China Sea: China, the Philippines, and Vietnam, 1970-2015 (2022) *The National Bureau of Asian Research* [NBR Special Report #99] 3

18. *Ibid.*, 2.

19. Isaac Kardon, *China's Law of the Sea: The New Rules of Maritime Order* (Yale University Press 2023) 32-34.

20. *Ibid.*, 34

21. See e.g., Gabriel Honrada, 'China using AI for decisive edge in South China Sea' (*Asia Times*, 6 March 2023), available at <<https://asiatimes.com/2023/03/china-using-ai-for-decisive-edge-in-south-china-sea/>>; Jonathan Hall, 'Artificial Intelligence in the South China Sea' (*Global Risk Insights*, 28 December 2018), available at <<https://globalriskinsights.com/2018/12/artificial-intelligence-turning-tide-asia-pacific/>>.

the coming years and, although this development is in some ways still in its infancy, now is the time to closely examine these technological developments and their potential implications for the international legal field and global political relations.

3. Datafication in the South China Sea

The world is undergoing rapid and increasing ‘datafication’.²² This also applies to the maritime domain, including the South China Sea. As Andrew Chubb states: “Today, the South China Sea is seen as one of the world’s conflict hot spots, with volumes of information available on daily developments”.²³ Quoting a commander from the PRC’s People’s Liberation Army (PLA), the *South China Morning Post* recently reported that: “Data collection has become one of our key tasks in regular training, which is now an integral part of our detachment”.²⁴ Moreover, the methods and speed of data collection itself are increasing, and with it, the volume of data collected. This is in part because the collection processes, as well as their analysis, are becoming increasingly

22. See e.g. Sheik Jamil Ahmed, ‘Datafication: Unleashing the Power of Data in the Digital Age’ (*Medium*, 15 July 2023), available at <<https://medium.com/dataduniya/datafication-unleashing-the-power-of-data-in-the-digital-age-1550d82dbd88>>.

23. Chubb (n 17) 4

24. Minnie Chan, ‘Chinese navy looks to big data to give it an edge’ *South China Morning Post* (10 October 2023), available at <<https://www.scmp.com/news/china/military/article/3237356/chinese-navy-looks-big-data-give-it-edge>>. See for a short introduction to the PLA e.g. Caitlin Campbell, ‘China Primer: The People’s Liberation Army (PLA)’ (26 September 2023) Congressional Research Service [Doc IF 11719], available at <<https://crsreports.congress.gov/product/pdf/IF/IF11719>>.

automated.²⁵ These are important factors in the pursuit of dominance in ‘algorithm confrontation’ i.e. the idea behind PRC’s key operational concept of ‘intelligentized warfare’, which holds that the side with the data and algorithm advantage in a dispute or conflict will prevail.²⁶

Datafication has long taken place in the maritime realm. Whether for the purposes of marine research or tracking shipping traffic, new databases proliferate. The examples in the following subsections discuss different types of data and data collection initiatives to illustrate the wealth of data and variety of data types that exist about the South China Sea. While these examples demonstrate that smaller, manually collected datasets have long existed and that the quantitative, data-driven study of maritime disputes has been a staple of the domain, they simultaneously illustrate the upward trend of datafication. AI requires data, in large quantities and preferably well curated and annotated, with reliable meta-data for the purpose of training and validation of models. In light of this fact, it is therefore instructive to examine the existing practices and level of datafication, to better understand the feasibility, variety and quality of AI-powered applications that could be developed by leveraging these different data types.

25. Kristen Gunnes, ‘China’s Gray-Zone Capabilities in the East China Sea’ in J W Greenert (ed), *Murky Waters in the East China Sea: Chinese Gray-Zone Operations and U.S.-Japan Alliance Coordination* (May 2021) *The National Bureau of Asian Research* [Special report #90] 16. See also Ryan Fedasiuk, Jennifer Melot, and Ben Murphy, ‘Harnessed Lightning: How the Chinese Military is Adopting Artificial Intelligence’ (Center for Security and Emerging Technology, October 2021) 18, 51; Anthony Capaccio, ‘US Navy, UK, Australia Will Test AI System to Help Crews Track Chinese Submarines in the Pacific’ (*Bloomberg*, 2 December 2023), available at <<https://www.bloomberg.com/news/articles/2023-12-02/us-navy-will-test-ai-system-to-help-crews-track-chinese-subs-in-the-pacific>>.

26. *Infra* Section 5; For more information on these notions and other key operational concepts of the PLA, see Edmund J Burke and others, ‘People’s Liberation Army Operational Concepts’ (29 September 2020) RAND Corporation Research Report [Doc No RR-A394-1], esp. 21-23.

3.1 Conflict & claims data

As part of the Maritime Awareness Project (MAP) at the National Bureau of Asian Research (NBR), which covers maritime security issues in the Indo-Pacific through mapping technology and analysis, a Special Report was published in 2022 entitled ‘Dynamics of Assertiveness in the South China Sea: China, the Philippines, and Vietnam, 1970–2015’.²⁷ This report, written by Andrew Chubb, draws on qualitative and quantitative data to provide an original data-focused analysis and to identify historical trends of assertive behaviour between these states and assess the implications for the disputes in the South China Sea. The report is accompanied by the Maritime Assertiveness Visualization Dashboard – an interactive online tool illustrating key findings.²⁸ Drawing on the standardised events data from the Maritime Assertiveness Time Series (MATS) dataset, categorised by Chubb into four categories of assertiveness,²⁹ users have the opportunity through the report and the dashboard “to explore key trends and relationships encased in the data”.³⁰

In a similar vein, *Issue Correlates of War* (ICOW), founded by Paul Hensel, is a research project that “is collecting systematic data on contentious

27. Chubb (n 17).

28. ‘Maritime Assertiveness Visualization Dashboard (MAVD)’ (2022), available at <<https://experience.arcgis.com/experience/6501849117f8482093427d243929c629/>>. See for an analysis of the use of dashboards in the humanitarian context and on the notion and implications of “dashboard fever” Fleur E Johns, *#Help: Digital Humanitarianism and the Remaking of International Order* (OUP 2023) 167-168.

29. These include ‘statements and actions that advance the claimants’ position in a dispute’: (1) declarative, (2) demonstrative, (3) coercive, and (4) use of force; the events can be categorized by domain of contestation, specific issue, target country, and geographic area, see Darlene Onuorah and Olivia Truesdale, ‘Foreword’ in Chubb (n 18).

30. Johns (n 28) 167-168.

issues in world politics”.³¹ It began over 20 years ago with data collection and now comprises four different issue data sets on territorial, identity, river, and maritime claims.³² The subset of maritime claims, led by Sarah Mitchell, has been described as “the most comprehensive source of data on maritime disputes worldwide”.³³ Supplementary datasets for the ICOW Project are included to help in subsequent data collection and analysis and are used for testing hypotheses. They concern colonial history, historical State names, multilateral treaties of pacific settlement, and non-State actors.³⁴ The Asia Maritime Transparency Initiative (AMTI) project includes visualizations of the maritime claims of the Indo-Pacific, as well as the outcomes of the 2016 *Philippines v China* case at the Permanent Court of Arbitration (with an accompanying ‘Arbitration Support Tracker’).³⁵ Similarly, the Institute for China-America Studies published a South China Sea Maritime Tracker in 2020.³⁶

This type of data is useful for keeping up with the arguments, claims, and assertions made by States that are of international legal relevance. As the PRC notoriously does not specifically or publicly announce the extent of its claims, giving the appearance of incrementally ever-expanding

31. Paul Hensel and Sara McLaughlin Mitchell, ‘Project Description’ (17 November 2019), available at <<http://www.paulhensel.org/icow.html#desc>>.

32. Bryan Frederick, Paul Hensel, Christopher Macaulay, ‘The Issue Correlates of War Territorial Claims Data, 1816–2001’ (2017) 54 (1) *Journal of Peace Research* 99; Paul Hensel and Sarah McLaughlin Mitchell, ‘From territorial claims to identity claims: The Issue Correlates of War (ICOW) Project’ (2017) 34 (2) *Conflict Management and Peace Science* 126.

33. Chubb (n 17) 4. See also Sara McLaughlin Mitchell, ‘Clashes at Sea: Explaining the Onset, Militarization, and Resolution of Diplomatic Maritime Claims’ (2020) 29 (4) *Security Studies* 637.

34. Ibid.

35. Asia Maritime Transparency Initiative, ‘Arbitration Support Tracker’ (18 July 2023), available at <<https://amti.csis.org/arbitration-support-tracker/>>.

36. ICAS Maritime Issue Tracker Team, ‘The South China Sea Maritime Tracker: China’s Sovereignty and Sovereign Rights and Jurisdiction Claims’ (3 September 2020), available at <<https://storymaps.arcgis.com/stories/a08a8e24badc4ea68b7cafb3cfc556a>>.

maritime claims, such data and data visualization tools may be useful in keeping up with changing assertions.³⁷

3.2 Public opinion & social media data

The South China Sea Data Initiative project, led by political scientists Renard Sexton and Nico Ravanilla, aims to, amongst other things: “create a new, systematic dataset documenting conflict in the South China Sea over the past decade”; “collect and analyse elite and public opinion survey data from littoral countries”; and “generate policy-relevant and theoretically-driven empirical analysis about international relations, conflict and globalization”.³⁸ Their data collection, spanning from 2012-2020, includes both discrete events and reports, i.e. individual news items that provide information about the activities that occurred and the location of an event.³⁹

Other potential types of data in this category include social media data that facilitates, for example, social media analytics and sentiment analysis.⁴⁰ An example from a different context of how social media data can be useful, beyond giving insights into public opinion, is ‘Twiplomacy’. In a 2019 article, a data-driven approach, albeit still manually conducted, was used to shed light on the relationship between social media data and

37. Galang (n 10).

38. ‘The South China Sea Data Initiative’ (2024), available at <<https://scsdi.org/>>.

39. Ibid. See also Nico Ravanilla and Renard Sexton, ‘South China Sea Data Initiative Public Opinion Survey Pre-Analysis Plan’ [unpublished pre-analysis plan available on OSF] (September 2021), available at <<https://osf.io/dt9z>>.

40. See e.g. Lei Guo, Kate Mays and Jianing Wang, ‘Whose Story Wins on Twitter?’ (2019) 20 (4) *Journalism Studies* 563; Hongyu Wang and Tianji Cai, ‘Media exposure and Chinese college students’ attitudes toward China’s maritime claims and disputes in the South and East China Seas’ (2018) 4 (1) *Cogent Social Sciences*; On the role of sentiment in this context, see e.g. David Groten, *How Sentiment Matters in International Relations: China and the South China Sea Dispute* (Columbia University Press, 2019).

customary international law.⁴¹ The author analysed the language used in Tweets from official State accounts to see to what extent they bore out their *opinio juris*, as a constitutive element of customary international law.⁴² In this way, insofar as international legal arguments and maritime claims by States are being presented on social media platforms, this data might be increasingly relied on in the international law context.

These data types could, for example, be used to gain insights into how State endorsed narratives are accepted by the general population as well as track their further spread on social media. This data type is therefore interesting from the perspective of a State, like the PRC, that has an interest in how its diplomatic, strategic, and legal approaches are being received, both domestically and internationally.⁴³

3.3 Geospatial data

Geospatial data, such as marine scientific research data, for example datasets like those from the United States government's National Center for Environmental Information (NCEI), could be of primary importance for gaining an edge in the South China Sea.⁴⁴ The NCEI receives oceanographic data from different observing systems and has the world's larg-

41. J A Green, 'The Rise of Twiplomacy and the Making of Customary International Law on Social Media' (2022) 21 (1) *Chinese Journal of International Law* 1 [in which the author argues that States' increased use of social media for issuing official statements means that this material has become part of the "raw material" of customary international law].

42. See on this also Emilie van den Hoven, 'A Computational Turn in Customary International Law' in Irene Couzigou and Edouard Fromageau, *International Law and Technological Change: Testing the Adaptability of International Law* (Edward Elgar Press, forthcoming).

43. See on the importance of legal narrative in international law Aurel Sari, 'Norm Contestation for Strategic Effect: Legal Narratives as Information Advantage' (2023) 83 *ZaöRV* 119-153.

44. National Center for Environmental Information: National Oceanic and Atmospheric Administration' (NCEI, 12 June 2023), available at <<https://www.ncei.noaa.gov/news/new-daily-international-comprehensive-ocean-atmosphere-data-set>>.

est collection of surface and marine observations, i.e. the International Comprehensive Ocean Atmosphere Data Set (ICOADS), spanning from 1662 to the present day.⁴⁵ This dataset includes environmental data on sea surface temperature, air temperature, sea level pressure, and wind speed and direction. These observations are gathered from ships, buoys, oil rigs and coastal offshore structures, as well as increasingly by autonomous vehicles such as drones. The abovementioned AMTI project is also relevant with regard to this data type, as it “strive[s] to provide the most complete, accurate, and up-to-date source of geospatial information on maritime Asia”.⁴⁶ It includes maps on South China Sea energy exploration and development, depicting China’s maritime power projection network, and the South China Sea’s features.

While the collection of this type of data is by no means unique to China, the PRC has the world’s largest fleet of civilian research vessels that serve a dual-purpose function of conducting scientific research that can also be used to advance key strategic ambitions.⁴⁷ In a 2024 report by the Center for Strategic and International Studies, maritime activity data was collected using the AI-driven Windward Intelligence platform.⁴⁸ This data revealed that Chinese research vessels carried out hundreds of thousands of hours of operations globally over the past few years, including in the South China Sea, providing the PLA with critical data to enhance its knowledge of the undersea environment. As the report

45. International Comprehensive Ocean-Atmosphere Data Set’ (last updated 7 October 2023), available at <<https://icoads.noaa.gov/>>.

46. Asia Maritime Transparency Initiative, ‘Maps of the Asia Pacific’ (2024), available at <<https://amti.csis.org/maps/>>; Infra Section 3.1.

47. Matthew P Funaiole, Brian Hart and Aidan Powers-Riggs, ‘Surveying the Seas: China’s Dual-Use Research Operations in the Indian Ocean’ (*Center for Strategic and International Studies*, 10 January 2024) [Hidden Reach Report], available at <<https://features.csis.org/hiddenreach/china-indian-ocean-research-vessels/>>.

48. See the Windward company website, available at <<https://windward.ai/solutions/predictive-risk-insights/>>.

emphasises, such data is “a crucial precursor to confidently deploying naval forces abroad”.⁴⁹

3.4 Vessel and shipping traffic data

The United Nations Conference on Trade and Development (UNCTAD) estimated in 2015 that ca. 80 percent by volume and 70 percent by value of all trade is transported by sea.⁵⁰ A third of global shipping passes through the South China Sea.⁵¹ Given the amount of shipping and vessel traffic, there is also an astounding amount of data available. Global Maritime Traffic, as only one example, is a service developed to deliver:

[O]pen access to important information about changing global maritime traffic patterns, providing international maritime stakeholders and policymakers with actionable intelligence to support critical maritime safety, efficiency and sustainability initiatives. Our purpose is to observe and document maritime patterns to enable better coordination of global marine activities.⁵²

Additionally, they also offer a Global Maritime Traffic Density Service (GMTDS), which is provided by the U.S. National Geospatial-Intelligence Agency (NGA) and is purported to enhance maritime safety. This service was developed to “collect and apply advanced analytics to hundreds of billions of [Automatic Identification System] messages data

49. Funairole (n 47)

50. UNCTAD, ‘Review of Maritime Transport report 2015’ (2015) UNCTAD/RMT/2015.

51. See ChinaPower Project by the Center for Strategic and International Studies in Washington D.C., <https://chinapower.csis.org/much-trade-transits-south-china-sea/#easy-foot-note-bottom-1-3073>.

52. Global Maritime Traffic, ‘Improving Access to Maritime Data and Analytics’ (Last updated 2022), available at <<https://globalmaritimetraffic.org>>.

from multiple sources”.⁵³ This “cutting edge geo-analytics and massive computing power” supports actors in use cases such as critical navigation safety analysis, fishing activity monitoring, port activity monitoring, and environmental and economic activity monitoring.⁵⁴

There are many other providers of such tailored services who make this type of data open access about vessel and ship traffic, with examples including Marine Vessel Traffic, Ship Location, and Spire Maritime.⁵⁵ Moreover, the International Monetary Fund (IMF) and the World Bank, using various machine learning and spatial data processing techniques, have undertaken a joint effort to map out and “harness the wealth of information generated by [Automatic Identification System] messages and determine whether these insights can inform trade analysis, development work, and public policies”.⁵⁶ This demonstrates the relevance and increasing employment of these data types for international actors to gain insights into these issues and inform their strategies and policies.

53. Ibid; see especially ‘GMTDS Methodology and Output’ section.

54. Ibid.

55. See respectively: Marine Vessel Traffic, ‘South China Sea Ship Traffic Live Map’, available at <<https://www.marinevesseltraffic.com/SOUTH-CHINA-SEA/ship-traffic-tracker>>; Ship Location, ‘South China Sea Ship Traffic Live Map’, available at <<https://www.shiplocation.com/wikishipia/regions/rivers/SOUTH-CHINA-SEA/MARINE-TRAFFIC>>; On Spire Maritime also see Section 4.1 on AI and tracking, where a concrete example is given of how this type of data is leveraged in AI-powered applications to track down specific vessels that are potentially in violation of international law.

56. Diego Cerdeiro et al., ‘Using marine spatial data to inform development work and public policies’ (*World Bank Blogs*, 28 February 2022), available at <<https://blogs.worldbank.org/opendata/using-marine-spatial-data-inform-development-work-and-public-policies>>; also see generally on AI and International Organisations like the World Bank and the IMF, Emilie van den Hoven, ‘Making the Legal World: Normativity and International Computational Law’ (2022) 3 (1) *Communitas* 31, 39–42.

3.5 Sensor data

In 2016, one of China's largest state-owned shipbuilding corporations was reported to have suggested the construction of an 'Underwater Great Wall Project' consisting of ships and subsurface sensors.⁵⁷ This was reported as having the potential to "significantly erode the undersea warfare advantage held by U.S. and Russian submarines and contribute greatly to China's future ability to control the South China Sea".⁵⁸ Some of these sensors form part of 'Argo', a global scientific observation project that involves close to 30 countries, which together manage a global array of almost 4000 robotic profiling floats and sensors. PRC involvement in such an initiative has also been described by some commentators as a move to 'boost scientific data in disputed waters' to the benefit of the PLA.⁵⁹

Although the purpose of sensor data collection is often scientific in nature, some simultaneously view these initiatives as another part of China's efforts to control the Sea:

It is unrealistic to assume that [the Chinese Navy's] sensor data cannot be accessed by the [People's Liberation Army Navy] for military purposes. And they may be part of a much larger sensor network, most of which

57. Although sensor data can perhaps better be described as a *method* for collecting certain data types, particularly geospatial data, connected to specific type of hardware, the various ongoing initiatives in this domain warrant its separate discussion here.

58. Catherine Wong, 'Underwater Great Wall': Chinese firm proposes building network of submarine detectors to boost nation's defence' *South China Morning Post* (19 May 2016), available at <<https://www.scmp.com/news/china/diplomacy-defence/article/1947212/underwater-great-wall-chinese-firm-proposes-building>>.

59. See for more information on Argo: National Oceanic and Atmospheric Administration (Global Ocean Monitoring & Observing), available at <<https://globalocean.noaa.gov/research/argo-program/>>; Viola Zhou, 'Beijing deploys sensors in South China Sea to boost scientific data in disputed waters' *South China Morning Post* (13 October 2016), available at <<https://www.scmp.com/news/china/diplomacy-defence/article/2027687/china-deploys-south-china-sea-sensors-boost-scientific>>.

is unseen beneath the waves. This reinforces China's strategic advantage over other countries in the region, and can be used to monitor U.S. Navy movements.⁶⁰

This type of data forms an important part of what China calls the 'Blue Ocean Information Network'.⁶¹ Research done by the AMTI reported that the state-owned China Electronics Technology Group Corporation (CETC) presented three long-term goals for an extensive future Blue Ocean Information Network, which AMTI summarised as: (1) 2025 – "Complete construction of the Blue Ocean Information Network in 'key maritime areas of [Chinese] jurisdiction' and begin 'Belt and Road' marine network construction"; (2) 2035 – "Build out the 'Belt and Road' marine network to fully support the construction of China's Maritime Silk Road"; and (3) 2050 – "Expand construction to the 'oceanic polar information network' and lead development of the 'global ocean information industry'."⁶²

4. Artificial intelligence in the South China Sea

One may expect that where data is available and stakes in prediction, analysis, classification, and pattern recognition are high, AI will make its ap-

60. H Sutton, 'China Builds Surveillance Network In South China Sea' (*Forbes*, 5 August 2020), available at <<https://www.forbes.com/sites/hisutton/2020/08/05/china-builds-surveillance-network-in-international-waters-of-south-china-sea/>>.

61. Joseph Trevithick, 'South China Sea Underwater "Environmental" Sensor Net Could Track U.S. Subs' (*The Drive*, 29 June 2019), available at <<https://www.thedrive.com/the-war-zone/10906/south-china-sea-underwater-environmental-sensor-net-could-track-u-s-subs>>.

62. Asia Maritime Transparency Initiative (AMTI), 'Exploring China's Unmanned Ocean Network' (16 June 2020), available at <<https://amti.csis.org/exploring-chinas-unmanned-ocean-network/>>.

pearance – sooner rather than later. It is therefore perhaps unsurprising that AI is already of great importance in the maritime industry. Key industry players are increasingly working with AI to improve automation processes, replacing manual input with data-driven and predictive information, or to detect patterns and anomalies using large datasets. AI is employed in fleet management to optimize routes, predict maintenance needs, and enhance scheduling. It has also been used to enable more efficient resource allocation, cost reduction and to maximize fleet performance.⁶³

Beyond these uses of AI for industry, various types of AI-driven applications are being developed with different purposes for usage by States and other international actors, such as: (1) to monitor (State) conduct and facilitate various forms of observation and tracking; (2) to execute or conduct operations to varying degrees of autonomy; and (3) generate new strategies or devise courses of action. These purposes are not exhaustive nor mutually exclusive but serve to provide insight into different AI-powered systems for the maritime domain, including by way of examples in the South China Sea context, that could be developed leveraging the various data types outlined in the previous section.⁶⁴

4.1 Artificial intelligence for monitoring and tracking

SynMax is a firm that specialises in machine learning applications for the maritime domain. Its intelligence product, ‘Theia’, works by fusing

63. Spire Maritime, ‘Maritime Artificial Intelligence & Machine Learning: Ultimate Guide’, available at <<https://spire.com/maritime/maritime-artificial-intelligence-and-machine-learning/>>.

64. Crucially for the context of this contribution, one can for example also think of using AI-driven systems, such as unmanned maritime vehicles, for the purpose of gathering more data, see e.g. Stephen Chen, ‘Beijing plans an AI Atlantis for the South China Sea – without a human in sight’ *South China Morning Post* (26 November 2018), available at <<https://www.scmp.com/news/china/science/article/2174738/beijing-plans-ai-atlantis-south-china-sea-without-human-sight>>; Gunnes (n 25) 16.

multiple data streams, and it is claimed that the company's proprietary approach enables them to detect and identify vessels that engage in the illegal deception of navigation systems by turning off AIS signals and synthetically projecting AIS locations, a practice better known as 'AIS spoofing'.⁶⁵ For example, it has been reported that Theia has been used to combine Spire Maritime's AIS data with satellite imagery "in a way that negates any advantage that a dark ship may utilize in an effort to stay hidden".⁶⁶ It is also reported that Theia has been successfully used by leading maritime insurance providers to support the ascertainment of whether a specific vessel was engaging with Iran and taking on sanctioned oil. According to the AIS data in that case, the vessel seemed to be staying in a single location outside Iranian waters but "Theia's ability to automatically identify, attribute and track vessels at scale helped the insurance provider to see beyond the AIS data and ensure compliance with the law".⁶⁷ Systems like this are already being used by important international actors like the United Nations and will likely swiftly become increasingly important in the evidentiary processes that lie at the root of proving and sanctioning past or present violations of maritime law.⁶⁸

Remote sensing satellites powered by AI are also increasingly used to track vessels in real-time. Chinese researchers, with the use of an AI-driv-

65. "AIS spoofing" has been defined as providing falsified identification information, whereas turning off automatic identification system signals has been described as "going dark", see Windward, 'AIS Spoofing: new technologies for new threats' (4 December 2022), available at <<https://windward.ai/blog/ais-spoofing-new-technologies-for-new-threats/>>; Spire Maritime, 'Uncovering dark vessels with fusion technology', available at <<https://spire.com/case-study/maritime/uncovering-dark-vessels-with-fusion-technology/>>.

66. Matkov (n 2).

67. Ibid.

68. The firm Windward is predictive intelligence company that has developed Maritime AI that offers similar functionality. The United Nations is listed on their website as a customer and quoted as having said that "Windward is a valuable source of intelligence for the Panel's investigations concerning maritime sanctions and North Korea", available at <<https://windward.ai/solutions/predictive-risk-insights/>>.

en satellite, were reportedly able to automatically identify an aircraft carrier and alert Beijing with the precise coordinates.⁶⁹ In another test of the ‘space-based AI’, the same satellite detected and obtained coordinates of military aircraft, naval ships, and strategic assets like oil storage tanks.⁷⁰ According to reports, the Chinese government is planning extensive global satellite projects with satellites carrying AI processors.⁷¹ As Chen points out, “these smart communication satellites could receive and analyse raw data from traditional remote sensing satellites, identify targets of interest, and then pass the information to end users at home with little time delay”.⁷² Whereas in the past, the Chinese military would have had to collect and analyse huge amounts of raw satellite data, and results would not be known until much longer after the event, these new computational resources would exponentially strengthen China’s real-time monitoring capabilities.

4.2 Autonomous Maritime Vehicles

The use of Unmanned Maritime Vehicles (UMVs) is by no means a new phenomenon. For example, unmanned surface vessels were used in nuclear weapons tests to collect radioactive water samples in 1946 at Bikini Atoll, and remote-controlled unmanned boats were used for minesweep-

69. Tanmay Kadam, “Tracking America” — China Claims Its AI-Powered Satellite Monitored US Naval Activity In New York In ‘Real Time’ (*The EurAsian Times*, 10 May 2022), available at <<https://eurasianimes.com/tracking-america-china-claims-its-ai-powered-satellite-monitored/>>.

70. Stephen Chen, ‘Chinese smart satellite tracks US aircraft carrier in real time, researchers say’ *South China Morning Post* (10 May 2022), available at <<https://www.scmp.com/news/china/science/article/3177079/chinese-smart-satellite-tracks-us-aircraft-carrier-real-time>>.

71. Andrew Jones, ‘China conducts launch to test satellite internet capabilities’ (*SpaceNews*, 23 November 2023), available at <<https://spacenews.com/china-conducts-launch-to-test-satellite-internet-capabilities/>>.

72. Chen (n 70).

ing operations during the Vietnam war.⁷³ However, the use of uncrewed and autonomous maritime systems has grown rapidly over the past few years as a result of progress in AI, and more specifically developments in machine learning. For example, more than ninety countries and non-state actors operate surveillance or weaponised crewless systems in support of combat operations.⁷⁴ The capacity and capabilities of UMWs have been augmented drastically and they are now used to provide enhanced situational awareness, reduce human workload, and improve mission performance, at reduced risk to personnel and at reduced cost. Such is their contribution that Keating has stated that:

The time may come when ocean shipping is done by fully autonomous vessels. Even now, AI can support human crews on vessels at sea to improve compliance with the international law of the sea, including the UN Convention on the Law of the Sea (UNCLOS) and other treaties and norms that govern hydrographic charting and safe navigation.⁷⁵

In 2018, the International Maritime Organization (IMO) adopted a framework for Maritime Autonomous Surface Ships (MASS), i.e. ships that can operate independently of human interaction to varying degrees.⁷⁶

In early 2023, China inducted an unmanned research vessel equipped with an autonomous navigation system ('Zhu Hai Yun') that is capable

73. Raul Pedrozo, 'Unmanned and Autonomous Warships and Military Aircraft', in James Kraska and Young Kil Park (eds), *Emerging Technology and the Law of the Sea* (CUP, 2022) 275-6.

74. *Ibid.*, 273.

75. Steven Geoffrey Keating, 'Artificial Intelligence to Facilitate Safe Navigation of Ships', in Kraska and Park (n 73).

76. International Maritime Organisation, 'Framework for the Regulatory Scoping Exercise for the Use of Maritime Autonomous Surface Ships (MASS)' (7 December 2018) Doc. MSC/100/20, annex 2, para 3-4.

of carrying smaller, sensor-equipped Unmanned Surface Vehicles (USV), Unmanned Underwater Vehicles (UUV), and Unmanned Aerial Vehicles (UAV) for monitoring purposes.⁷⁷ It was reported that “even though the vehicles were designed for marine scientific research, they will be used to gather intelligence in the disputed South China Sea”.⁷⁸ In addition to this, there have been reports suggesting that China is working on improving undersea target detection and recognition on the basis of deep learning-based image recognition and target identification systems for undersea vehicles.⁷⁹

5. Strategy generation and simulation

AI is also being put to use in the sensitive areas of diplomacy and strategic decision-making. In 2018, the Chinese Ministry of Foreign Affairs confirmed to the South China Morning Post that they were making use of an early prototype of an AI-driven system for diplomatic

77. Alia Shoaib, ‘China launched the world’s first AI-operated ‘mother ship,’ an unmanned carrier capable of launching dozens of drones’ (*Business Insider*, 11 June 2022), available at <<https://www.businessinsider.com/china-launches-worlds-first-ai-unmanned-drone-aircraft-carrier-2022-6?international=true&r=US&IR=T>>; Baird Maritime, ‘Vessel Review: Zhu Hai Yun – Chinese-built drone mothership boasts autonomous sailing systems’ (*Baird Maritime*, 31 March 2023), available at <<https://www.bairdmaritime.com/work-boat-world/specialised-fields/marine-research-and-training/vessel-review-zhu-hai-yun-chinese-built-drone-mothership-boasts-autonomous-sailing-systems/>>.

78. Prakash Panneerselvam, ‘Unmanned Systems in China’s Maritime ‘Gray Zone Operations’ (*The Diplomat*, 23 January 2023), available at <<https://thediplomat.com/2023/01/unmanned-systems-in-chinas-maritime-gray-zone-operations/>>.

79. Ryan Fedasiuk, ‘Leviathan wakes: China’s growing fleet of autonomous undersea vehicles’ (*Center for International Maritime Security*, 17 August 2021), available at <<https://cimsec.org/leviathan-wakes-chinas-growing-fleet-of-autonomous-undersea-vehicles/>>.

purposes.⁸⁰ This system reportedly “draws on huge amounts of data, with information ranging from cocktail-party gossip to images taken by spy satellites” to contribute to forming Chinese diplomatic strategies.⁸¹ Although it is difficult to gauge the level of sophistication, the quality of the output of such systems, or the pervasiveness of usage by the Chinese State, in large part due to the secrecy around such developments, similar initiatives in other States signal the interest in the deployment of digital or AI-driven diplomacy.⁸²

AI applications are also being developed for various types of simulations, such as naval ‘war-gaming’⁸³ or simulations related to China’s artificial island building activities in the South China Sea. In the context of the latter, a programme was reported in Spring 2023 as already being used by China.⁸⁴ This was construed by commentators as a move that “could help to bolster [China’s] maritime claims in the hotly contested maritime region”.⁸⁵ This AI-driven computer simulation system is purported to predict price tags for the construction, operation, and main-

80. Stephen Chen, ‘Artificial Intelligence, immune to fear or favour, is helping to make China’s foreign policy’ *South China Morning Post* (30 July 2018), available at <<https://www.scmp.com/news/china/society/article/2157223/artificial-intelligence-immune-fear-or-favour-helping-make-chinas>>.

81. *Ibid.*

82. See e.g. DiploFoundation, ‘Mapping the challenges and opportunities of artificial intelligence for the conduct of diplomacy (2019) [commissioned by the Finnish Ministry of Foreign Affairs]; F Cafiero, ‘Datafying diplomacy: How to enable the computational analysis and support of international negotiations’ (2023) 71 *Journal of Computational Science* 1.

83. See e.g. Sentient Digital (SDi), ‘AI Naval wargaming: SDi’s fleet emergence’ (21 December 2023), available at <<https://sdi.ai/blog/naval-wargaming-fleet-emergence/>>; Stephen Chen, ‘Chinese scientists work on powerful new ‘submarine killer’ with eye on US far into the South China Sea’ *South China Morning Post* (4 November 2023), available at <<https://www.scmp.com/news/china/science/article/3240039/chinese-scientists-work-powerful-new-submarine-killer-eye-us-far-south-china-sea>>.

84. Honrada (n 21).

85. *Ibid.*

tenance of a logistics network across dozens of islands in the area. It was also reported that this network would boost China's economic activity and its claims in the disputed area.⁸⁶

A 2021 study by the Center for Security and Emerging Technology examined nearly 350 artificial intelligence-related equipment contracts awarded by the People's Liberation Army (PLA) and concluded that "Chinese leaders view AI as the key to transforming the PLA into a "world-class" globally competitive military force".⁸⁷ Unsurprisingly, the authors conclude that these advances in AI and autonomy will create new vulnerabilities for other States' forces operating in the Indo-Pacific. As this and the sections above demonstrate, the development of AI systems for usage in the context of the South China Sea by the PRC is in full swing.

It is also clear that the PRC is adopting an increasingly expansive and confrontational approach to asserting its maritime claims over the South China Sea. As datafication and AI are leveraged in the pursuit of these approaches, this could have multifaceted implications for the maritime domain and international law of the sea.⁸⁸ So where and how do these two developments collide? In a first attempt to shed light on these questions, the next section explores two related strategies employed by the PRC in the South China Sea: 'lawfare' and 'gray zone capabilities.'

86. Stephen Chen, 'AI just predicted the price tag for Beijing's South China Sea ambitions' *South China Morning Post* (3 March 2023), available at <<https://www.scmp.com/news/china/science/article/3212199/ai-just-predicted-price-tag-beijings-south-china-sea-ambitions>>.

87. Fedasiuk (n 25) iv.

88. See e.g. also Ifesinachi Okafor-Yarwood, 'West Africa's coast was a haven for piracy and illegal fishing – how technology is changing the picture' (*The Conversation*, 6 March 2024), available at <<https://theconversation.com/west-africas-coast-was-a-haven-for-piracy-and-illegal-fishing-how-technology-is-changing-the-picture-222803>>.

6. Algorithmic lawfare in the data-driven gray-zone of the South China Sea?

It is evident that AI is playing an increasingly crucial role in China's military and political strategies, and thus in the PRC's actions in the South China Sea. The question then becomes, what might the repercussions of this be for other key players in the maritime domain and for the international law of the sea? There are many ways to look at this question. The focus here is on a relatively less discussed angle through which these developments can be examined: 'lawfare' and related 'gray zone tactics'.⁸⁹ These notions constitute key operational concepts of the PRC's legal and political strategies. Lawfare has traditionally been described as the use, or misuse, of law as a substitute for traditional military means to achieve an operational objective.⁹⁰ The Chinese notion of *falu zhan*, translated as 'legal warfare', has been an essential element of China's strategic doctrine of 'Three Warfares' for a long time.⁹¹ In

89. But see e.g. Marta Hermez, 'Global Commons and the Law of the Sea: China's Lawfare Strategy in the South China Sea' (2020) 22 *International Community Law Review* 559-588; Douglas Guilfoyle, 'The rule of law and maritime security: understanding lawfare in the South China Sea' (2019) 95 (5) *International Affairs* 999, 1005; Jill I Goldenziel, 'Law as a Battlefield: The U.S., China and the Global Escalation of Lawfare' (2020) 106 *Cornell Law Review* (2021) 1085; and Braden Leach, 'Lawfare for the Future' (2023) 2023 *University of Illinois Journal of Law, Technology & Policy* 51.

90. Charles J Dunlap, 'Lawfare Today: A Perspective' (2008) 3 *Yale Journal of International Affairs* 146, 146. See for a short history on the different definitions of Lawfare Wouter G Werner, 'The Curious Career of Lawfare' (2010) 43 (1) *Case Western Reserve Journal of International Law* 61-72.

91. The other two being psychological warfare (the use of certain information, like propaganda, deception, coercion to influence an adversary's decision-making) and media or public opinion warfare (influencing domestic and international law public opinion) respectively, see Michael Clarke, 'China's Application of the 'Three Warfares' in the South China Sea and Xinjiang' (2019) 63 (2) *Orbis* 187, 191-92; Peter Mattis, 'China's Three Warfares' in Perspective' (*War on the Rocks*, 30 January 2018), available at <<https://warontherocks.com/2018/01/chinas-three-warfares-perspective/>>.

2003, this doctrine and the concept of legal warfare were explicitly set out and approved by the Chinese Communist Party Central Committee and the Chinese Military Commission.⁹² Since then, the PRC has sometimes been referred to as the most explicit and active practitioner of lawfare.⁹³ Goldenziel defines lawfare as ‘the purposeful use of law taken toward a particular adversary’ either with the goal of achieving a particular (strategic, operational, or tactical) objective, to bolster the legitimacy of one’s own such objectives, or to weaken the legitimacy of those objectives of an adversary.⁹⁴ Lawfare can broadly be understood as shaping the legal context and building legal justifications for such actions.⁹⁵

Gray zone tactics are a related, albeit arguably somewhat broader, category of operations that are ‘designed to exploit or create legal (and other) uncertainties for a military or strategic advantage’ or that fall short of warfare but are arguably beyond normal diplomatic, economic, or other activities.⁹⁶ Although not a legal concept per se, gray zone tactics “leverage legal categories and relationships [...] to advance strategic objectives”.⁹⁷ Moreover, it entails the use of “tools below the threshold of war to shift international rules, norms, distribution of goods, and patterns of authority to their benefit”.⁹⁸ Both these notions are therefore linked

92. Clarke (n 91) 191.

93. Ordre F Kittrie, *Lawfare: Law as a Weapon of War* (OUP, 2016) 161.

94. Goldenziel (n 89) 1097.

95. Peter Mattis, ‘China’s Three Warfares’ in Perspective’ (*War on the Rocks*, 30 January 2018), available at <<https://warontherocks.com/2018/01/chinas-three-warfares-perspective/>>.

96. Rob McLaughlin, ‘The Law of the Sea and the PRC Gray-Zone Operations in the South China Sea’ (2022) 116 (4) *The American Journal of International Law* 821; also see Bonny Lin et al., ‘A New Framework for Understanding and Countering China’s Gray Zone Tactics’ (Santa Monica, CA: Rand Corporation, 2022) 1.

97. McLaughlin (n 96) 825.

98. Michael J Mazarr, *Mastering the Gray Zone: Understanding a Changing Era of Conflict* (US Army War College Press, 2015) 12.

by falling into the gray spaces in between traditional categories of ‘law’ and ‘not law’ and ‘war’ and ‘not war’, with an aim to thwart, destabilize, weaken, attack, or constrain an adversary’s operational freedom.⁹⁹ Indeed, this approach also is sometimes jointly been described as ‘Gray Zone Lawfare’.¹⁰⁰

The PRC’s employment of lawfare is particularly clear in the maritime domain. China asserts time and again that their contentious maritime activities are permissible under international law.¹⁰¹ As Kardon rightly notes, this is clearly an intentional strategy: “underlying and enabling all of this activity is a more fundamental, if less immediately visible, tool of PRC maritime policy: the instrument of international law”.¹⁰² Contrary to popular perception, Beijing attaches much value to (international) law in its maritime dealings, albeit in an instrumental and strategic way. China’s maritime lawfare strategy in the South China Sea actively seeks to push the boundaries of what constitutes an acceptable interpretation of international law, as recognised under the UNCLOS and customary international law. Two senior U.S. Navy attorneys, James Kraska and Brian Wilson, have noted that:

Chinese strategists have taken an increasing interest in international law as an instrument to deter adversaries prior to combat ... [including by shifting the law of the sea] away from long-accepted norms of freedom

99. Atlantic Council, ‘Today’s Wars Are Fought in the “Gray Zone.” Here’s Everything You Need to Know About It’ *Hybrid Conflict Project* (23 February 2022), available at <<https://www.atlanticcouncil.org/blogs/new-atlanticist/todays-wars-are-fought-in-the-gray-zone-heres-everything-you-need-to-know-about-it>>.

100. Kittrie (n 13) 7.

101. See e.g. some of the arguments made in Chinese Society of International Law, ‘The South China Sea Arbitration Awards: A Critical Study’ (2018) 17 *Chinese Journal of International Law* 555-885 and the analysis of some of those arguments in terms of Lawfare in Hermez (n 89) 573-577.

102. Kardon (n 19) 5; Kittrie (n 93) 165.

of navigation and toward interpretations of increased coastal state sovereign authority.¹⁰³

They ominously warn that “China continues to advance on the battlefield of international law”.¹⁰⁴

The confrontational use by the PRC of non-uniformed maritime militia or fishing boats and fishermen in the South China Sea, the publication by the Chinese Society of International Law to elaborately and publicly reject the 2016 ruling by the Permanent Court of Arbitration, and the building of artificial islands have all been identified by commentators as clear instances of PRC lawfare to gradually assert its claims in the South China Sea.¹⁰⁵ Clearly, these activities will not change international law overnight. Nor do they seem intended to. Rather, they seem to be envisioned as small steps in a much longer game plan. Rather than winning an argument in an international legal forum tomorrow, Kittrie observes that these strategies often consist of or are accompanied by legal or legal-sounding arguments or narratives that ‘plant the seeds’ that slowly push international law in a certain direction.¹⁰⁶ Crucially for the purposes of this contribution, these pushes for incremental changes to international law happen both in word and in deed.¹⁰⁷ In addition to the

103. James Kraska & Brian Wilson, ‘China Wages Maritime “Lawfare”’ (*Foreign Policy*, 12 March 2009), available at <[http:// foreignpolicy.com/2009/03/12/china-wages-maritime-lawfare/](http://foreignpolicy.com/2009/03/12/china-wages-maritime-lawfare/)>.

104. Ibid.

105. Leach (n 89) 57; Goldenziel (n 89) 1104-1140.

106. Kittrie (n 13) 10.

107. For example, the use of the PRC’s People’s Armed Forces Maritime Militia (PAFMM) as part of the lawfare strategy has become known as “salami-slicing”, meaning that none of the small steps towards asserting China’s maritime claims (e.g. by the PAFMM gray zone operations creating a *de facto* operating presence in the South China Sea) are considered *casus belli* on their own, but they accumulate to change the status quo over time, see Goldenziel (n 89) 1105; also see Derek Grossman and Logan Ma, ‘A Short History of China’s Fishing Militia and What It May Tell Us’ (The Rand Blog, 6 April 2020), available at <<https://www.rand.org/pubs/commentary/2020/04/a-short-history-of-chinas-fishing-militia-and-what.html>>.

international legal claims put forth and international legal arguments made by the PRC, for example on the ‘9-dash line’ and China’s historic rights to the Sea, the relevance of (operational) conduct in the maritime domain should not be understated.¹⁰⁸ China’s operational actions in the South China Sea consolidate its position in the conflict and support the execution of the PRC’s lawfare strategy in the Sea.¹⁰⁹ These acts – whether it be patrolling, monitoring, and controlling access to certain maritime domains, building artificial islands, conducting marine scientific research and collecting data of various kinds, or placing oil rigs – directly or indirectly contribute to bolstering, consolidating, or acting in accordance with the PRC’s maritime claims, which often deviate from generally accepted international law.

As Kardon has thus noted, some of China’s operational practices make these expansionary claims possible. For example, he argues that they are directly enabled by substantial facilities built at Subi, Fiery Cross, and Mischief reefs in the South China Sea, as well as highly developed new infrastructures on the Paracel Islands.¹¹⁰ Such operations at sea are “undertaken expressly to advance China’s definition of ‘the rules’ through actions portrayed as defending China’s rights under international law”.¹¹¹ In this way, China’s conduct is an expression of its attempts to revise the rules of international law. In a broader understanding of the concept of lawfare, these types of actions are therefore relevant because they enable, influence, or aim to stretch the understanding of international law of the sea. As Trachtman has put it: “Part of an integrated lawfare operationalisation strategy is to enhance facts as a basis for legal claims as well as to

108. Hermez (n 89) 568.

109. Kardon (n 19); *Ibid.*, 4-5.

110. *Ibid.*, 5.

111. *Id.*

argue for beneficial rules in the development of customary international law and treaty law”.¹¹²

Indeed, given that State practice is one of the constituent elements of customary international law, all of this is particularly interesting in the context of international custom.¹¹³ In fact, China’s actions and claims, for example when they have advanced alternative interpretations of their EEZ, are argued by some to be aimed specifically at changing customary international law.¹¹⁴ Of course, one State’s conduct or stance does not amount to an international custom. However, a custom can be formed through the accumulation of State practice consisting of a wide range of State conduct, accompanied by *opinio juris*. Acquiescence to the candidate custom might also play an important role in this context: “[s]ince inaction may be viewed as acquiescence to the claim, China benefits legally from creating or bolstering a claim by creating a new island or other facts, and then militarily dissuading other states from contesting the claim.”¹¹⁵

Therefore, if China is trying to ‘change the rules’ and the interpretations of the law of the sea, its evidence might be most apparent from its practices, incrementally and interstitially, which are increasingly becoming data-driven and AI-powered.¹¹⁶ However, the role and influence of technology in this light is yet underexplored.¹¹⁷

112. Joel P Trachtman, ‘Integrating Lawfare and Warfare’ (2016) 39 *Boston College International & Comparative Law Review* 267, 274.

113. *Statute of the International Court of Justice* (1945) XV UNCIO 355, art 38(1)(b), available at <<https://digitallibrary.un.org/record/1300969>>.

114. Kittrie (n 13) 9-10.

115. Ibid 10.

116. Kardon (n 19) 30-31.

117. Crucial here is also the work of Ingvid Bode, ‘Contesting Use of Force Norms Through Technological Practices’ (2023) 83 *ZaöRV* 39-64 [in which the author shows how contestation to international norms takes the form of technologically-mediated State practices and that these practices can over time deliberatively and tacitly shape new norms].

Ordre Kittrie has recently argued, firstly, that information technology is itself a subject over which lawfare is waged.¹¹⁸ He argues that this battle is primarily being fought over issues such as the theft of intellectual property, the content of international law in the cyber arena, and telecommunication pipelines.¹¹⁹ Secondly, crucially, he argues that the ‘information technology revolution’ is a major contributing factor to the increasing impact and prevalence of PRC’s lawfare, including in the maritime domain.¹²⁰ The vast increase in data availability has enabled different actors to “quickly find and deploy many types of information at the level of detail and timeliness necessary to wage lawfare”.¹²¹ This includes commercial satellite imagery, ship-tracking websites, trade and foreign press articles from around the world, and many of the other data types discussed in Section 3. However, Kittrie’s account of technology’s influence on the gray-zone and lawfare does not go far enough. To only briefly touch on information technology as a subject of lawfare and increased data availability, as enabling the waging of lawfare, fails to pay due regard to the pervasiveness of the datafication at play and foregoes the discussion of AI either as a method or subject of lawfare altogether. Data and AI are likely to be a driving force of lawfare and the gray-zone going forward.

Indeed, Kirsten Gunnes has written about some of the impacts of data-driven and AI-powered gray-zone capabilities in relation to the East China Sea. Distinguishing between ‘conventional’ and ‘nonconventional’ gray-zone capabilities, she notes that both are increasingly enabled by technologies such as AI.¹²² To achieve the PRC’s objectives, China’s

118. He discusses maritime, aviation, and information technology domains as subjects of lawfare respectively.

119. Kittrie (n 13) 10-11.

120. *Ibid.*, 4; Kittrie (n 93) 48.

121. Kittrie (n 13) 11.

122. Gunnes (25) 12.

nonconventional gray-zone capabilities include cyberattacks for data-harvesting and interference operations, modernised satellite communications infrastructure, space-based survey, mapping, and navigation systems.¹²³ On the emerging technologies underpinning many of these efforts, Gunnes' pertinent observations deserve to be quoted at length:

China is investing in emerging technologies that will enable both its conventional and nonconventional gray-zone capabilities. These technologies include AI to gather data and algorithms and big data analytics to evaluate that information. Chinese writings have recently started referring to "intelligentized" (zhinenghua) warfare. This emerging concept suggests that future warfare will evolve from "system confrontation," which holds that modern war is a confrontation between opposing operational systems waged across all warfare domains, to "algorithm confrontation," which states that the side with the data advantage can dominate war with human-computer hybrid operations, AI, and big data.¹²⁴

The various data types discussed in Section 3 provide the foundation for the development of advanced and sophisticated AI-powered applications like those discussed in Section 4. These, in turn, can be (and are being) used in the South China Sea to bolster, monitor, and enforce interests and maritime claims in pursuance of maritime lawfare strategies. The data and AI relied upon by international actors in these contexts will increasingly be used to inform, execute, and justify their respective actions and claims and will play an important role in determining who comes out on top. Therefore, I argue that we can expect more advanced data-driven gray zone capabilities and we should prepare for an age where the international law of the sea will increasingly be an arena of algorithmic lawfare. Increasingly, *algorithm confrontation* will be the name of the game in the world's oceans and seas.

123. Ibid., 16.

124. Ibid., 17 (internal footnotes omitted).

7. Conclusion

On 25 October 2023, the United Kingdom's Minister of State gave a speech to the South China Sea conference in Ho Chi Minh City and stated that 'what happens in the South China Sea matters globally' and that '[t]he peace and prosperity of the South China Sea must remain a priority for all'.¹²⁵ This contribution has argued that rapidly emerging AI-powered applications in the maritime domain, and the datafication practices upon which they are built, will make a difference for what happens in the South China Sea and that "peace" might no longer look like it did before. In support of this claim, I have provided an overview of datafication initiatives and various concrete examples of AI-powered applications in the South China Sea. Focusing on the role of the PRC in this context, I have discussed how such technologies potentially play a significant role in maritime lawfare strategies and related gray zone capabilities in the South China Sea.

Director Yang Jiechi of the Chinese Communist Party (CCP) Central Committee for Foreign Affairs Commission explicitly expressed the PRC's mission to "actively guide the direction of change in the international order".¹²⁶ Some have therefore asked, if China is indeed changing the rules of the international legal order in the South China Sea, how would we even come to know and "by what process would such changes occur"?¹²⁷ The fact that some of the foremost experts on the subject are asking such questions points us right to the heart and the difficulty of

125. Anne-Marie Trevelyan, 'South China Sea Conference 2023: Speech by the UK Minister for the Indo-Pacific' (South China Sea Conference, Ho chi Minh City, 25 October 2023), available at <<https://www.gov.uk/government/speeches/south-china-sea-conference-2023-speech-by-the-uk-minister-for-the-indo-pacific>>.

126. From Yang Jiechi's 'Firmly Uphold and Practice' and 'Conscientiously Study and Publicize', both as cited in Kardon (n 19) 2.

127. Kardon (n 19) 12.

the matter at hand: it is not a straightforward matter to ascertain how the international legal order is changing and it might be happening in increasingly technological and stealthy ways.¹²⁸ For the future of international law and the international rule of law, it is therefore important to ask what the direction and magnitude of those changes might be and how they will come about.¹²⁹

Therefore, notions like algorithm confrontation, algorithmic lawfare, and data-driven gray zone capabilities could help us make sense of a swiftly changing landscape. These developments deserve our full attention, and more research is urgently needed to develop an adequate theoretical framework to contextualise such developments, lest the international legal order be technologically remade ‘in the gray’.

128. On “international law-making by stealth”, see E van den Hoven (n 57) 39.

129. Kardon (n 19) 4-5.

Applicability of the right of innocent passage to maritime autonomous surface ships: Exploring the potential role of advisory opinions

■ *Murat Sümer**

Abstract

The initial discussions at the International Maritime Organization (IMO) and academia have naturally centred around the compliance of the existing safety of navigation standards to Maritime Autonomous Surface Ships (MASS) operations thus far, while the broader implications for maritime security and international navigational rights such as innocent passage remain less explored. This article delves into the intricate legal interplay between MASS and the right of innocent passage under the UN Convention on the Law of the Sea (UNCLOS). In this respect, this article aims to analyse whether fully autonomous ships are entitled to the right of innocent passage. Moreover, considering the scope of IMO's mandate, this article proposes a cautious approach regarding the interpretation of fundamental principles of UNCLOS as opposed to the Convention's more flexible provisions, such as those germane to the regulation of shipping, while recognizing IMO as the appropriate plat-

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form for such deliberations. Against this backdrop, this article suggests revising the IMO's current classification of autonomy levels in order to address the potential concerns of coastal States and prevent legal tension with UNCLOS. Without such a revision, different practices may arise among coastal States regarding innocent passage. As a last resort, seeking an advisory opinion from the International Court of Justice by the IMO could clarify the legal status of MASS within the UNCLOS framework, especially regarding the right of innocent passage for fully autonomous vessels.

Keywords: UNCLOS, Innocent passage, MASS, International Court of Justice, IMO, Advisory opinion

1. Introduction

Maritime Autonomous Surface Ships (MASS) present numerous advantages ranging from offering better safety to being cost-effective, yet they also introduce legal complexities. This is primarily because the current legal framework assumes that the human element is physically present on board to perform certain functions. Unsurprisingly, this assumption is challenged by the nature of MASS.¹ The present legal architecture, first and foremost, includes the UN Convention on the Law of the Sea, 1982 (UNCLOS or the Convention),² and a myriad of legal instruments from the International Maritime Organization (IMO). Moreover, for

1. Henrik Ringbom and Robert Veal, 'Unmanned ships and the international regulatory framework' (2017) *Journal of International Maritime Law*, 23 (2), 101.

2. United Nations Convention on the Law of the Sea (UNCLOS) adopted 10 December 1982, entered into force 16 November 1994. 1833 UNTS 396.

the successful realisation of MASS operations, the Vienna Convention on the Law of Treaties, 1969 (VCLT)³ is also relevant in discussions regarding adopting new standards and amending or interpreting the existing rules.

Early discussions at the IMO and academia on MASS have naturally focused on the degree to which existing technical safety rules and standards can adapt to the realisation of autonomous operations. The relevant research appears to indicate that the ever-evolving autonomous ship-building technology is already advanced enough to enable MASS operations. After this initial first step which is mostly relevant to IMO's mandate and can be addressed therein, it might be plausible to examine the international navigational rights of MASS under the law of the sea regime with a view to introducing international navigation of MASS.

According to the 1948 Convention on the IMO,⁴ the Organization, as a specialised agency of the UN, has a worldwide mandate for the safety, security, and environmental performance of international shipping.⁵ It is widely recognised that the term 'competent international organization' in UNCLOS, when used in a singular form, refers specifically to the IMO. The IMO itself has also confirmed this approach as early as 1987. In the context of the innocent passage, Article 22(3) on the sea lanes and traffic separation schemes in the territorial sea refers to the recommendations of the competent international organization. It is well established

3. Vienna Convention on the Law of Treaties, adopted 23 May 1969, entered into force 27 January 1980. 1159 UNTS 331.

4. Convention on the International Maritime Organization (adopted 6 March 1948, entered in force 17 March 1958) 289 UNTS 48.

5. Murat Sumer, 'Overcoming the legal challenges of Maritime Autonomous Surface Ships (MASS) and compliance with UNCLOS and SOLAS: designation of a remote Master to assume the safety duties of a Master' (2023) Doctoral Thesis, Maastricht University], Maastricht University. <https://doi.org/10.26481/dis.20230411ms>, 10.

that the said reference alludes to the IMO.⁶

As per UNCLOS, the IMO is identified as the appropriate platform for the development of international shipping standards.⁷ The Convention, by referring to abstract rules to be developed at the IMO, deliberately avoids elaborating on the specific duties of States. In this manner, the drafters of UNCLOS successfully circumvented ‘freezing’ obligations and certain conditions at a particular point in time.⁸

Although UNCLOS was not adopted under the auspices of the IMO, the Convention’s generic shipping terms and provisions relevant to the international shipping regulatory framework can be interpreted by the IMO. This interpretative power aligns with the IMO’s mandate, which is further reinforced by UNCLOS itself. Having said that, it should not be overlooked that neither the IMO’s constituent treaty nor UNCLOS empower the IMO to deal with fundamental principles of the law of the sea. In this context, thus, a crucial question arises as to whether UNCLOS could accommodate all forms of MASS operations and to what extent the IMO can be the appropriate platform to address the pending issues.⁹

Against this backdrop, this article will explore the potential role of the IMO’s generally accepted international rules or standards (GAIRS) in addressing the legal tensions with UNCLOS. Furthermore, in light of

6. George K Walker, “Defining Terms in the 1982 Law of the Sea Convention IV: The Last Round of Definitions Proposed by the International Law Association (American Branch) Law of the Sea Committee,” (2005), 36 California Western International Law Journal 1, 28; and Andrianov, V. I., “The role of the International Maritime Organization in implementing the 1982 UNCLOS,” (1990), 14 Marine Policy 2, 120.

7. James Harrison, *Making the Law of the Sea* (CUP, 2011) 198-199.

8. Patrick Griggs, ‘International and Regional Organisations’ (2020) Journal of International Maritime Law - Volume 26 - Issue 6.

9. Baris Soyer, ‘Chapter 8 - Autonomous Vessels and Third-party Liabilities. The Elephant in the Room’, in Baris Soyer, *New Technologies, Artificial Intelligence and Shipping Law in the 21st Century* (Routledge, 2020), 114-115.

the foregoing, this article will also examine the interrelationship between the UNCLOS regime and fully autonomous ships (classified as MASS Degree IV by IMO), particularly concerning innocent passage and its implications for the IMO regulatory framework. Additionally, this article will propose recommendations to enable the IMO to address the relevant concerns of its Member States.

2. The role of the IMO in the introduction of MASS operations

Numerous maritime disasters have led to significant regulatory actions, whether in the form of amendments or the adoption of new treaty instruments over the years. For instance, the Titanic tragedy was the catalyst for the adoption of the International Convention for the Safety of Life at Sea (SOLAS).¹⁰ The Torrey Canyon incident exposed gaps in the existing liability and compensation framework, resulting in the formation of the IMO's Legal Committee (LEG). The capsizing of the Herald of the Free Enterprise ferry necessitated the introduction of the International Safety Management (ISM) Code.¹¹ Similarly, spill disasters such as the Exxon Valdez, Erika, and Prestige led to the phasing out of single-hull tankers.¹²

In the context of MASS, the IMO appears to adopt a different approach. Despite the absence of maritime incidents prompting immediate

10. International Convention for the Safety of Life at Sea, 1974, SOLAS as amended (adopted on 1 November 1974, entered into force on 25 May 1980). 1184 UNTS 3.

11. The ISM Code was adopted in 1993. It became mandatory with the entry into force of the 1994 amendments to the SOLAS Convention on 1 July 1998, which introduced Chapter IX to the Convention.

12. Frederick J Kenney, 'Global Regulation of Ships: The Future of Development and Implementation at the International Maritime Organization' (2018) 42 Tul Mar LJ 259.

action, the IMO has already undertaken a Regulatory Scoping Exercise (RSE) and has defined various degrees of autonomy in MASS, which will be discussed in detail below.¹³

2.1 Regulatory scoping exercise

IMO performed an RSE to examine the compliance of the present IMO Conventions and observe how they might apply to vessels that employ varying levels of automation. In this regard, apart from the Marine Environment Protection Committee (MEPC), other IMO Committees that have a role in adopting/amending treaty instruments reviewed the existing IMO legal framework. The Maritime Safety Committee (MSC), LEG, and Facilitation Committee (FAL), concluded their review exercise, respectively, in May 2021, July 2021, and May 2022. IMO's RSE is seen as a first step in analysing IMO instruments to identify whether they apply and/or prevent MASS operations.¹⁴

The main aim of the RSE was to evaluate the adequacy of the IMO's legal framework in relation to MASS. The RSE process was basically designed to create a foundational understanding of MASS. Additionally, the RSE's focus was on pinpointing the applicability of IMO instruments within its purview, rather than on the creation of new regulations. It is also noteworthy that IMO committees did not investigate the UNCLOS as it is not under their remit. Hence, the RSE is seen as a data gathering exercise to identify compliance issues with IMO treaty instruments rather than an attempt to regulate MASS. The conclusion of RSEs of the respective committees identified several high-priority issues cutting across mul-

13. David Molina Coello, 'Is UNCLOS Ready for the Era of Seafaring Autonomous Vessels?' (2023) 10 *The Journal of Territorial and Maritime Studies* 1, 34.

14. Available at <<https://www.imo.org/en/MediaCentre/HotTopics/Pages/Autonomous-shipping.aspx>>.

title IMO treaties, such as the development of MASS definition and the clarification of the relevant terminology especially concerning Degrees III and IV.¹⁵ Initial studies, including IMO's RSE, suggest that IMO conventions are unlikely to have significant direct conflicts or insurmountable obstacles to the introduction of autonomous ships.¹⁶

The establishment of the Joint MSC-LEG-FAL Working Group on MASS (JWG) in 2022 serves as an important milestone to tackle common key issues identified through RSE.¹⁷ Drawing from the results of these RSEs carried out by the three committees and any additional recommendations from these committees, the JWG is tasked with certain directives such as creating a work plan that considers and integrates the roadmaps developed by the committees and provides advice to the committees.¹⁸

The legal challenges and solutions in MASS certainly vary, based on different elements such as crewing, crew location, and autonomy level. Therefore, differences in these elements need to be addressed separately rather than trying to come up with a generic fit for all approaches.¹⁹ IMO intends to adopt a non-mandatory MASS Code in 2025. Moreover, IMO aims to use the said non-mandatory instrument as a foundation for a mandatory goal-based MASS Code, estimated to enter into force in 2028.²⁰

15. Available at <<https://www.imo.org/en/MediaCentre/HotTopics/Pages/Autonomous-shipping.aspx>>. See also Sumer (n 5) 185

16. Henrik Ringbom, 'Regulating Autonomous Ships—Concepts, Challenges and Precedents' (2019) *Ocean Development & International Law*, 50:2-3, 141-169, 161.

17. See MSC.1/Circ.1638, LEG.1/Circ.11, and FAL.5/Circ.49.

18. IMO Repository, Joint MSC-LEG-FAL Working Group on MASS, 2nd session, Report of the Joint Working Group, MASS-JWG 2/WP.1, 21 April 2023, 2-3.

19. Ringbom (n 16) 142-3.

20. Available at <<https://www.imo.org/en/MediaCentre/HotTopics/Pages/Autonomous-shipping.aspx>>.

2.2 Degrees of automation

Basically, the concept of autonomy relates to how tasks are divided between human elements and automated systems. This encompasses a wide range, from human elements on board to completely autonomous systems operating independently (i.e., unmanned). As functions become more autonomous, there is a significant departure from conventional navigation, which raises inevitable legal questions.²¹

At the outset, it is important to note that there may be diverse types of vessels, each with varying autonomous capabilities or serving different purposes. Therefore, from the regulatory standpoint, it is not advisable to use generic definitions for such vessels; instead, specific reference points need to be established. In this context, the terminology developed by the IMO, namely ‘MASS’, is a good starting point as it excludes several types of ships with autonomous capabilities such as submersible and military ships.

In 2017, the IMO recognised that MASS could encompass a range of automation levels. This includes ships with partially automated systems that assist human crews, as well as fully autonomous systems capable of handling all aspects of a ship’s operations without any human involvement. To facilitate the RSE of the respective IMO committees, in 2018, during the 99th session, MSC, being the lead committee regarding MASS, commenced the development of a framework for the RSE.

MSC defined the term MASS as a ship capable of operating with varying degrees of human involvement. This involved a preliminary definition of MASS and the classification of autonomy levels. It has been rightly noted that MASS is capable of operating at various levels of autonomy, potentially encompassing multiple degrees, within a single journey. The MSC identified four levels of autonomy to aid in this review exercise.

21. Ringbom (n 16) 147.

Both the LEG and the FAL utilised the glossary developed by the MSC for their respective RSEs. This ensured a consistent approach across the various IMO committees.²²

Significantly, the IMO identified four degrees of autonomy to be used during its RSE. This classification is indeed important for analysing the applicability of existing regulatory frameworks (i.e., UNCLOS and IMO Conventions). In this respect, Degree I refers to ships with automated processes and decision support. However, seafarers are on board. Basically, they are the current generation of ships.²³ Degree II indicates a remotely controlled ship with seafarers on board. Notably, seafarers are on board to assume control and operate the ship when needed.²⁴ Degree III denotes remotely controlled ships. However, in this category, there are no seafarers on board.²⁵ Degree IV is determined exclusively for fully autonomous ships. Perhaps, rather oddly, to emphasise the differences with other degrees, it was suggested that there is no human element either on board or at the Remote-Control Centre (RCC) as it is noted that the operating system of Degree IV²⁶ is capable of determining actions by itself.²⁷

In this regard, Degree IV significantly differs from the other degrees of MASS as there is no human involvement at all. Hence, this highest

22. Maritime Safety Committee, Outcome of the Regulatory Scoping Exercise for the Use of MASS, MSC.1/Circ.1638, 3 June 2021; and Legal Committee, Outcome of the Regulatory Scoping Exercise and Gap Analysis of Conventions emanating from the Legal Committee with respect to MASS, LEG.1/Circ.11, 15 December 2021.

23. This mode of navigation has seafarers on board to operate and control its systems and functions. Certain operations may be automated and could operate unsupervised, but seafarers are ready to take control when necessary.

24. The ship is controlled and operated from RCC either on shore or another ship.

25. The ship is operated from an RCC, and no seafarers are present on board.

26. The ship's operating system can independently make decisions and actions demonstrating its maximum level of independence.

27. Available at <<https://www.imo.org/en/MediaCentre/HotTopics/Pages/Autonomous-shipping.aspx>>.

degree also complicates the regulatory landscape as it is uncharted waters for not only the IMO rules and standards but also for the broader law of the sea regime. The three categories (I to III) are centred on replacing key traditional functions performed by men on board with automation. However, the final category of Degree IV represents true autonomy.²⁸

Notably, it is expected that MASS will not always operate exclusively under a higher level of automation, at least for a considerable time. The autonomy level may be decreased depending on the location, maritime traffic density, navigational hazards, or coastal/port state's domestic requirements. Thus, presumably, the degree of autonomy would be dynamic and will change based on operational parameters or legal requirements rather than solely on the capability of a vessel. Therefore, it is highly probable that MASS will be designed to transfer control to either a minimal crew present on board or to a remote master (analogically ship master) located in RCC.²⁹ Moreover, it is also very likely that a master on board or a remote master, regardless of the mode of operation/level of autonomy, will be available at all times to intervene when required.³⁰ However, the current classification of levels of autonomy does not accommodate this scenario.

The JWG reviewed a document³¹ that suggested redefining the acronym MASS with a broader scope as 'MASS and Systems'. This proposed change is to encompass not only the ships themselves but also the systems used for autonomous operations on MASS and the systems for RCCs. During the discussion of this proposal, the JWG recognised that there was a divergence of views regarding definitions and terminology related to the concept of MASS. It was noted that addressing this issue

28. Ringbom (n 16) 149-151.

29. Soyer (n 9) 110-111.

30. Ringbom (n 16) 141-169; Report of the JWG (n 18) 10.

31. See MASS-JWG 2/3/2.

extended beyond merely agreeing on the term MASS and warranted further discussions. The JWG during its second session reached a consensus to maintain the use of the term MASS along with its existing definition while acknowledging the possibility of future modifications. Additionally, the JWG concurred that the issue of the definitions and terminology concerning MASS warrants further deliberation by the MSC in the process of developing the MASS Code. Furthermore, remarkably, the JWG agreed that the MSC should also discuss the various degrees of autonomy.³²

In this regard, the JWG recently observed that there should be a ‘human master’, for all modes of navigation, and the master of a MASS should have the means to intervene when needed. The JWG requested the relevant IMO committees to agree with the said understanding of the JWG that there should be a ‘human master’, either on board or at RCC, responsible for a MASS, regardless of the level of autonomy.³³ However, it is yet to be seen whether this appropriate request will be embraced by the MSC, LEG, and FAL. Arguably, this represents an opportunity for IMO to refine the current four degrees of autonomy.

3. UNCLOS

The law of the sea regime is a composite of various rules and principles specifically tailored to govern activities on or in respect of the oceans. It regulates all public law matters regarding ocean affairs, notably navigational rights on oceans, and aims to create a universally applicable legal

32. Report of the JWG (n 18) 10.

33. *Ibid.*, 12.

regime.³⁴ As a framework convention, UNCLOS consists of international rules and standards for providing maritime safety, security, and the protection of the marine environment through coastal, flag, and port State mechanisms.³⁵ In this respect, jurisdiction, as a reflection of sovereignty, alludes to the competence of States to exercise their authority over property and persons.³⁶ The coastal, flag, and port States can perform various roles in maritime law in relation to their location, sovereignty, boundaries, functions, and treaties that they are parties to.³⁷

There is no general right for ships to call at foreign ports. Pursuant to UNCLOS,³⁸ port States have wide discretion to set the entry conditions to their ports. Thus, arguably, port States have the right to deny access to MASS, similar to conventional ships, to their ports, provided that such prohibition is non-discriminatory. Under the UNCLOS, coastal states possess restricted jurisdiction over foreign vessels. Nonetheless, within the territorial sea, they can enact domestic rules in relation to the right of innocent passage. This includes measures aimed at protecting the coastal state's environment. Although the jurisdiction of coastal States is not as strong as port States, the authority of coastal States over ships increases as the vessels approach their shores. It is important to note that IMO Conventions do not explicitly govern the nature and extent of coastal State jurisdiction. Instead, UNCLOS outlines these jurisdictional matters and fundamental obligations, and it delegates to the IMO – i.e., the

34. Gaetano Librando, 'The International Maritime Organization and the Law of the Sea', in David Joseph Attard et al. (eds), *The IMLI Manual on International Maritime Law - Volume I* (OUP, 2014) 589-590.

35. Malcolm Shaw, *International Law* (CUP, 2017) 453-458.

36. Oya Ozcayir, *Port State Control* (LLP, 2004); Cedric Ryngaert, 'The Concept of Jurisdiction in International Law', in Alexander Orakhelashvili (ed.), *Research Handbook on Jurisdiction and Immunities in International Law* (Edward Elgar Publishing, 2015).

37. John N K Mansell, *Flag State Responsibility* (Springer-Verlag Berlin Heidelberg, 2009) 18.

38. UNCLOS, Articles 25(2), 211(3), 255.

‘competent international organization’ – the task of developing detailed international standards within the framework of UNCLOS.³⁹ The IMO Conventions lay down detailed technical regulations for enforcement purposes under the UNCLOS framework.⁴⁰

UNCLOS is renowned for facilitating the evolution of international maritime law through the progressive development of international law at the IMO. Typically, the UNCLOS system instructs States to defer to the IMO as the competent international organization or to implement IMO’s GAIRS. This practice of referring to IMO proves to be an efficient way of progressive development, as it lessens the need for direct amendments to UNCLOS itself. UNCLOS almost always references the IMO’s GAIRS in the context of international shipping and navigation. This recognition underscores the IMO’s pivotal role in adopting comprehensive technical regulations and standards for regulating international shipping. Typically, such GAIRS are adopted within the IMO framework aligned with the objectives of UNCLOS, and they are within the scope of the mandate of the Organization. The IMO, through its mandate, has played an essential role in the progression of the UNCLOS regime via GAIRS. By incorporating international standards through references to IMO rules, UNCLOS assigns a significant role to the GAIRS adopted by the IMO. Consequently, the exact scope of States’ obligations is left to be determined by the IMO.⁴¹

Although various manifestations of States’ jurisdiction are defined by UNCLOS, IMO specifies how these jurisdictions can be exercised in

39. Aldo Chircop, Meinhard Doelle and Ryan Gauvin, ‘International Law and Policy Considerations for Shipping’s Contribution to Climate Change Mitigation’ (2018) CIGI, 23; Sumer (n 5) 122 and 127.

40. Robin Churchill, ‘The 1982 United Nations Convention on the Law of the Sea’, in Donald Rothwell (ed.), *The Oxford Handbook of the Law of the Sea* (OUP, 2015) 43-44.

41. Sumer (n 5) 61-64 and 138-140.

practice. Judge Lucky of the International Tribunal for the Law of the Sea (ITLOS) emphasised the dynamic nature of the Convention in the context of technological progress by noting that UNCLOS is a living instrument that grows and adapts to evolving conditions. Notably, UNCLOS does not preclude the progressive development of the law of the sea. This is implied in both its preamble and main text. The progressive development of the law of the sea regime is assisted by the ongoing institutional relationship between UNCLOS and IMO treaty instruments. In this respect, within the jurisdictional framework basis of UNCLOS, IMO builds upon its legal instruments to provide substance to the States in their jurisdiction. IMO further provides comprehensive procedures for a Port State Control (PSC) mechanism primarily aimed at remedying the non-compliance of flag States.⁴²

At this juncture, it is also worth noting that the potential amendment of UNCLOS is not only necessary in general, but is also not optional due to the inherently rigorous amendment mechanisms of the Convention. Indeed, UNCLOS sets a very high standard for changes, which likely explains why these mechanisms have not been used so far.⁴³ Unlike the IMO treaty instruments, which are designed to quickly adapt to new developments in shipping technology through tacit amendments, UNCLOS lacks similar flexibility due to its constitutional character.⁴⁴ Moreover, UNCLOS has been broadly characterised as a living instrument to highlight its capacity to adjust to changes in the long term. It is reason-

42. Agustin Blanco-Bazan, 'The IMO: UNCLOS Framework for Global Ocean Governance' in David Joseph Attard and others (eds.), *The IMLI Treatise on Global Ocean Governance Volume III: IMO and Global Ocean Governance* (OUP, 2018) 27-35; Sumer (n 5) 75, 84; and Request for an Advisory Opinion submitted by the Sub-Regional Fisheries Commission, Advisory Opinion, ITLOS Case No. 21, 2 April 2015, ITLOS Reports 2015, Separate Opinion of Judge Lucky.

43. UNCLOS, Articles 312 and 313.

44. Sumer (n 5) 61-62.

able to conclude that there is no compelling need to amend UNCLOS for the first three degrees of MASS.⁴⁵

3.1 Innocent passage

Under UNCLOS, States have the right to establish the breadth of their territorial seas up to a maximum limit of 12 nm, where they have territorial sovereignty.⁴⁶ While coastal States exercise sovereignty, they are still required to respect the rights of foreign flagged vessels. The main limitation for coastal States is the allowance for foreign vessels to engage in innocent passage through their territorial sea.⁴⁷

Innocent passage is one of the various navigational rights stipulated by UNCLOS, which is contingent on the maritime jurisdiction areas. The right of innocent passage falls certainly short of the freedom of navigation on the high seas as it is subject to certain conditions.⁴⁸ This navigational right permits ships to traverse the territorial sea of coastal states, balancing the coastal state's territorial sovereignty with the access rights of other flag states.⁴⁹

As per Article 17 of UNCLOS, ships of all States enjoy innocent passage rights. Remarkably, the innocent passage regime represents a compromise between the interests of the coastal and flag States. UNCLOS establishes a number of conditions governing the exercise of

45. Rozemarijn J. Roland Holst, *Change in the Law of the Sea* (Brill Nijhoff, 2022) 108; Keyuan Zou and Anastasia Telesetsky, *Marine Scientific Research, New Marine Technologies and The Law of The Sea* (Brill Nijhoff, 2021) 49.

46. UNCLOS, Articles 2 and 3.

47. Sümer (n 5) 128.

48. UNCLOS, Part II, Section 3, Subsection A.

49. David Cluxton, 'The Chicago Convention 1944 in an UNCLOS 1982 World: Maritime Zones, Continental Shelves, Artificial Islands, and Some Other Issues' (2020) 41 U La Verne L Rev 137, 144.

this right. UNCLOS defines both the phrases ‘passage’ and ‘innocent’ which are crucial parts of the innocent passage regime. For a passage to qualify as innocent, it must be continuous and expeditious. Furthermore, it must be conducted for the purpose of entering or leaving internal waters or traversing the territorial sea without entering internal waters. According to Article 19, passage is considered innocent as long as it does not pose a threat to the peace, order, or security of the coastal State. The same provision also stipulates when a passage becomes prejudicial to the peace, good order, or security of the coastal States by outlining specific activities. In this respect, UNCLOS enunciates a number of activities deemed to be prejudicial, mostly associated with military purposes.⁵⁰

Significantly, the enlisted activities do not include the technical capabilities or crewing arrangements of vessels, which can be important in the context of MASS. The criteria employed in Article 19(2) to assess innocent passage primarily centre around the activities of ships. Thus, it may be safe to argue that the advanced capabilities of MASS cannot be construed directly as an activity that would be prejudicial to the peace and good order of security of coastal States.

50. “...Passage of a foreign ship shall be considered to be prejudicial to the peace, good order or security of the coastal State if in the territorial sea it engages in any of the following activities: (a) any threat or use of force against the sovereignty, territorial integrity or political independence of the coastal State, or in any other manner in violation of the principles of international law embodied in the Charter of the United Nations; (b) any exercise or practice with weapons of any kind; (c) any act aimed at collecting information to the prejudice of the defence or security of the coastal State; (d) any act of propaganda aimed at affecting the defence or security of the coastal State; (e) the launching, landing or taking on board of any aircraft; (f) the launching, landing or taking on board of any military device; (g) the loading or unloading of any commodity, currency or person contrary to the customs, fiscal, immigration or sanitary laws and regulations of the coastal State; (h) any act of wilful and serious pollution contrary to this Convention; (i) any fishing activities; (j) the carrying out of research or survey activities; (k) any act aimed at interfering with any systems of communication or any other facilities or installations of the coastal State; (l) any other activity not having a direct bearing on passage.”

Having said that, as per Article 21, coastal States can adopt domestic laws to govern innocent passage and regulate the manner in which the right of innocent passage is exercised within their territorial sea. Such rules can be related to the safety of navigation and the regulation of maritime traffic; the protection of navigational aids and facilities, as well as other facilities; the protection of cables and pipelines; the conservation of the living resources of the sea; the prevention of infringement of fisheries regulations; the preservation of the environment and the prevention, reduction, and control of pollution; marine scientific research and hydrographic surveys; and the prevention of infringement of customs, fiscal, immigration, or sanitary laws. However, it is significant that such regulations must conform to both UNCLOS and other rules of international law (i.e., IMO legal instruments).⁵¹

In the context of MASS, notably, such national laws cannot be related to the design, construction, manning or equipment of foreign ships unless they are giving effect to IMO's GAIRS.⁵² Additionally, according to Article 24, coastal States are prohibited from imposing conditions on foreign vessels that practically deny or impair the right of innocent passage. Hence, as long as MASS are classified as ships, it is reasonable to assume that they would be entitled to the right of innocent passage.

While this discussion extends beyond the scope of this article, it will suffice to note here that since the human element is still involved in

51. Samantha Jordan, 'Captain, My Captain: A Look at Autonomous Ships and How They Should Operate under Admiralty Law' (2020) 30 *Ind Int'l & Comp L Rev* 283, 297-298; Simon McKenzie, 'When Is a Ship a Ship? Use by State Armed Forces of Uncrewed Maritime Vehicles and the United Nations Convention on the Law of the Sea' (2020) 21 *Melb J Int'l L* 373, 379-381; Rachel Mangas and Matthew Festa, 'Chapter 10: Sea, Air and Outer Space Operations', in *Operational Law Handbook* (International and Operational Law Department, 2018) 153 and 159; Andrew Norris, 'Legal Issues Relating to Unmanned Maritime System Monograph' (2013) US Naval War College, 31; Sümer (n 5) 123-124.

52. Aldo Chircop, 'Testing International Legal Regimes: The Advent of Automated Commercial Vessels' (2018) *German Yearbook of International Law*.

MASS Degrees I, II, and III, there is not much doubt that vessels while operating at these degrees would be recognised as ships and, consequently, would enjoy innocent passage rights provided that they also abide by UNCLOS and IMO's future GAIRS.

However, this assumption might not straightforwardly apply to Degree IV, where no human element is in the loop as per the current IMO classification. It is plausible to observe that UNCLOS was intended to address manned vessels. For instance, Article 94(4)(b) notes that:

each ship is in the charge of a master and officers who possess appropriate qualifications, in particular in seamanship, navigation, communications and marine engineering, and that the crew is appropriate in qualification and numbers for the type, size, machinery and equipment of the ship...

When these rules were originally formulated, the assumption was that ships would be manned, and the identified functions would be carried out by crew members onboard. Therefore, this most advanced level of autonomous navigation mode necessitates closer investigation. Nevertheless, this should not be misconstrued as an indication that the drafters of UNCLOS had the intention to exclude technological developments. Conversely, by embracing the progressive development of the law of the sea and pointing out IMO to develop further regulations and standards, it provides the necessary flexibility. This approach ensures that the international regulatory framework can evolve over time.⁵³

A few preliminary research seems to suggest that the right of innocent passage can also be enjoyed by MASS Degree IV arguing that the coastal States do not have the power to adopt rules and regulations on the manning of the ships. Although this approach may look reasonable at first sight, arguably, it may not be the case. Indeed, the general rule of treaty interpretation of the VCLT states that a treaty shall be interpreted-

53. Ringbom (n 16) 20; Sumer (n 5) 262.

ed in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in light of its object and purpose. Obviously, the objective of using the term ‘manning’ was not to acknowledge the innocent passage of fully autonomous systems, but rather to ensure that different crewing numbers required by different ships, probably according to their size and type, are not dictated by the coastal States. Indeed, the ordinary meaning of the term “manning” certainly does not denote any human element at all either on board or on shore. Evidently, although UNCLOS aims to establish an international legal order for oceans, it was not the intention of the drafters of UNCLOS to fully cover unmanned systems as ships for the innocent passage.⁵⁴

UNCLOS is intended to serve as an umbrella instrument providing a flexible legal framework for global ocean governance. The longevity and relevance of UNCLOS hinge on its capacity to evolve with changing conditions. UNCLOS has demonstrated its adaptability over time, especially through supplemental agreements and interpretative methods.⁵⁵ Nonetheless, it is important to emphasize that the flexibility of UNCLOS in regulating international shipping does not extend to fundamental navigational principles, which represent a compromise between competing interests and rights. However, this should not be interpreted as an indication that the UNCLOS system is inherently resistant to the evolution of shipping. For instance, pursuant to Article 23, this right is even extended to foreign nuclear-powered ships and ships carrying nuclear or other inherently dangerous or noxious substances, which are considered to pose specific risks for the coastal states. According to Judge Anderson, such passage rights of third states are plainly set out in UN-

54. Jordan (n 51) 297-298; McKenzie (n 51) 380-381.

55. Sümer (n 5) 63-64.

CLOS.⁵⁶ Jordan aptly observes that it would be questionable whether fully autonomous vessels would be perceived as posing a greater risk than the aforementioned vessels.⁵⁷ Rather, there is simply a need for clarification to avoid the fragmentation of international law, particularly concerning the regime of innocent passage, and to prevent divergent practices among States.

It might be safe to observe that, given Article 17's explicit statement that 'ships' of all States are entitled to innocent passage, the enjoyment of this right is fundamentally centred around ships. Therefore, UNCLOS seems to adopt a restrictive approach in this context. Arguably, this is not surprising, considering the innocent passage regime is designed to balance the competing interests and rights of flag and coastal States. Thus, the critical issue is determining whether MASS Degree IV qualifies as ships under the UNCLOS framework. Given that the definition issue is beyond the scope of this study, it will suffice to note here that essentially Degree IV is not a different type of ship but rather a certain mode of navigation. Having said that, it may be plausible to argue that the mode of navigation mentioned is not in line with the current regulatory framework. In this regard, one should not overlook the fact that UNCLOS does not specify a right for non-vessels, such as objects, systems, or devices, to exercise the right of innocent passage.⁵⁸

Moreover, customary international law currently lacks a legal basis to confer the right of innocent passage to non-vessel systems due to the absence of relevant State practice supporting the presence of this right. Therefore, arguably, contending that the fully autonomous mode of navigation should be granted the right of innocent passage without ensuring

56. MOX Plant case (Ireland v. United Kingdom), Order, Provisional Measures, ITLOS Case No. 10, ICGJ 343 (ITLOS 2001), 3rd December 2001, Separate Opinion of Judge Anderson, 30.

57. Jordan (n 51) 297-298.

58. McKenzie (n 51) 380.

that it would be widely accepted could pose a potential risk of damaging the well-established regime of the innocent passage as well. In this regard, the interests of coastal states, be it security, safety, or environmental protection, must be squarely considered and addressed.⁵⁹

Even though the UNCLOS was not subject to IMO's RSE, the issue came up in different meetings. For instance, the United Arab Emirates (UAE) submitted a document to the LEG titled "Implications of UNCLOS for MASS" consisting of a preliminary examination of UNCLOS. Upon reviewing the submission at its 110th session, the LEG concurred that UNCLOS does not hinder the regulation of MASS operations without specifying different degrees of automation. It might be interesting to note that most of the delegations that took the floor felt that UNCLOS, as a framework instrument, did not impede the regulation of MASS by IMO pertinent to the 'safety of navigation'.

In this context, the initial analysis by the UAE suggests that MASS may be entitled to the right of innocent passage,⁶⁰ as long as MASS does not pose any potential risk to the coastal States. Most of the Member States attending the LEG seemed to support this approach, in line with the UAE's submission. Nonetheless, it is important to note that not all Member States were in agreement, expressing that the competent body for interpreting certain legal aspects of UNCLOS is not the IMO but the States Parties to UNCLOS.⁶¹

59. Oliver Daum, 'The Implications of International Law on Unmanned Naval Craft' (2018) 49 J Mar L & Com 71, 93-94; Hitoshi Nasu and David Letts, 'The Legal Characterization of Lethal Autonomous Maritime Systems: Warship, Torpedo, or Naval Mine?' (2020) 96 Int'l L Stud Ser US Naval War Col 79, 92; Norris (n 51) 33-35.

60. "MASS, like an ordinarily manned ship, should enjoy the right of innocent passage unless a ship's manning will not as such render passage non-innocent under the wording of UNCLOS."

61. IMO Repository, Draft Report of the Legal Committee on the Work of its 110th Session, LEG 110/WP.1/Rev.1, 6 April 2023; Legal Committee, 110th session, LEG 110/11/3, 23 December 2022, LEG 110/11/3 5-6.

However, significantly, a Member State noted its concerns at the 105th session of the MSC which may be relevant in the context of the innocent passage right:

Argentina thanks the information provided with regard to tests of the functioning of MASS. At the same time, we would like to recall that degrees of autonomy 3 and 4 are not contemplated in the United Nations Convention on the Law of the Sea (UNCLOS) and therefore their possible entry into a coastal States' jurisdictional waters is subject to consent by coastal States⁶²

The UNCLOS may indeed need to be taken into account during the IMO's further regulatory process in relation to the fundamental and well-established law of the sea principles and their interaction with MASS Degree IV.⁶³

Notably, during the second meeting of the JWG⁶⁴, regarding the role of the IMO as the appropriate platform for regulating MASS under the broader context of UNCLOS, a delegation raised concerns about the capability of the IMO in this vein. The Member State pointed out that the operation of autonomous vessels was not anticipated in UNCLOS. Therefore, it presents a significant legal challenge that needs to be addressed elsewhere to ensure that the IMO's work is founded on a robust legal basis. Thus, even in these preliminary phases, this approach is noteworthy, possibly hinting at what could follow during the regulatory stages at the IMO.⁶⁵

The wording of the Convention might be seen by some coastal states as a potential barrier to the introduction of MASS Degree IV operation as

62. IMO Repository, Report of the MSC, 105th session, MSC 105/20/Add.2, 24 May 2022, MSC 105/20/Add.2 Annex 43, 8.

63. Ringbom (n 16) 21-22.

64. See also IMO Seminar on Development of a Regulatory Framework for Maritime Autonomous Surface Ships (MASS), 6 September 2022.

65. Report of the JWG (n 18), 3.

regards innocent passage, though it has less impact on remotely operated ships and even less on periodically unmanned ships (Degrees II - III).⁶⁶ In this vein, it would be a truism to note that IMO is not the governing body for UNCLOS.⁶⁷ However, it is also doubtful that there is any other effective mechanism that can meaningfully serve such a purpose since the functions of the Meeting of States Parties (SPLOS) mechanism⁶⁸ fall short of interpreting the substantial aspects of the UNCLOS.⁶⁹ In the absence of an effective UNCLOS machinery to address the legal ambiguities surrounding the application of the innocent passage rights to MASS Degree IV and its intersection with global shipping, IMO might opt for seeking an advisory opinion in accordance with its mandate.

4. Seeking an advisory opinion

An advisory opinion essentially represents a legal analysis provided by an international court or tribunal upon the request of an authorised entity. Its purpose is primarily to elucidate a legal question through the provision of legal advice, rather than resolving a specific international dispute. Evidently, the capacity to issue advisory opinions must be based on a legal foundation. In other words, the power to seek or offer advisory opinions must derive from the constituent instruments and must be explicitly granted.⁷⁰ In this regard, Article 96 of the UN Charter states that the UN

66. Ringbom (n 16) 21-22.

67. MSC (n 62) Annex 43, 3.

68. UNCLOS, Article 319(2)(e).

69. See the Role of the Meeting of States Parties in the Interpretation of UNCLOS in Sumer (n 5) 85.

70. ITLOS Case No. 21 (n 42), Written Statement of Australia.

General Assembly or the Security Council may request the International Court of Justice (ICJ) to give an advisory opinion on any legal question. Significantly, it also allows other UN organs and specialised agencies to seek an advisory opinion from the ICJ. According to Article 65 of the ICJ's Statute,⁷¹ in addition to resolving contentious cases, the ICJ can also provide advisory opinions on legal issues related to international law referred to it by the UN and its specialised agencies.⁷² Notably, the advisory opinions issued by the ICJ do not possess direct binding force. Nevertheless, such opinions carry profound legal weight, stemming from the ICJ's standing as the primary judicial organ of the UN. Thus, an advisory opinion serves as a valuable instrument contributing to the clarification of international law in a particular area.⁷³ Naturally, such requests must be related to the legal questions pertinent to the mandate of such entities. Furthermore, pursuant to the 1948 IMO Convention, any legal question which cannot be settled by the IMO Assembly must be referred to the ICJ for an advisory opinion.⁷⁴

Indeed, seeking an advisory opinion from the principal judicial organ of the UN is not uncharted waters for the IMO as a specialised agency of the UN.⁷⁵ During the very first Assembly of the IMO (it was named

71. ICJ Statute, Article 65: "The Court may give an advisory opinion on any legal question at the request of whatever body may be authorized by or in accordance with the Charter of the United Nations to make such a request."

72. Anxhela Mile, 'Emerging Legal Doctrines in Climate Change Law - Seeking an Advisory Opinion from the International Court of Justice' (2021) 56 *Tex Int'l L J* 59, 63-64.

73. Jae Woon Lee and Xiongfeng Li, 'Ongoing Tension in the Air: The Need for ICJ's Advisory Opinion on Air Defense Identification Zone (ADIZ)' (2018) 6 *Korean J Int'l & Comp L* 5, 19-21.

74. IMO Convention, Article 75: "Any legal question which cannot be settled as provided in Article 74 shall be referred by the Organization to the International Court of Justice for an advisory opinion in accordance with Article 96 of the Charter of the United Nations."

75. Constitution of the Maritime Safety Committee of the Inter-Governmental Maritime Consultative Organization, Advisory Opinion of 8 June 1960: I.C.J. Reports 1960.

the Inter-Governmental Maritime Consultative Organisation – IMCO until 1982) held in 1959, a significant dispute emerged among Member States regarding the elections for the MSC.

This dispute led to the adoption of a resolution by the Assembly in 1959, seeking an advisory opinion on the following question:

Is the Maritime Safety Committee of the Inter-Governmental Maritime Consultative Organisation, which was elected on January 15, 1959, constituted in accordance with the Convention for the Establishment of the Organisation?

In order to address these divergent opinions, the ICJ tackled the following preliminary matters: the interpretation of the term ‘elected’, the discretionary or mandatory nature of the elections, the definition of the phrase ‘having an important interest in maritime safety’, the definition of the ‘largest ship-owning nations’, and the criteria for the constitution of ‘registered tonnage’. The ICJ concluded that the constitution of the MSC was not in compliance with the 1948 IMO Convention.⁷⁶

Returning to the discussion on innocent passage, the concerns of the coastal States could be mitigated if MASS Degree IV were to deactivate its autonomous systems during its innocent passage. This would allow for full control by a human element, either on board or at an RCC.⁷⁷ However, should the IMO choose not to revise the current classification of the four degrees of MASS, particularly by specifying that MASS Degree IV will operate with lower levels of autonomy while in coastal waters (which would also mean including the right to innocent passage), and/or

76. Ademun-Odeke, ‘From the Constitution of the Maritime Safety Committee to the Constitution of the Council: Will the IMCO Experience Repeat Itself at the IMO Nearly Fifty Years On -The Juridical Politics of an International Organization’ (2007) 43(1) *Texas International Law Journal* 55, 65; K. R. Simmonds, ‘The Constitution of the Maritime Safety Committee of IMCO’ (1963) 12 *Int’l & Comp LQ* 56, 57.

77. Nasu and Letts (n 59) 96.

in specific maritime areas due to navigational hazards or high maritime traffic density, etc., it may be advisable, depending on the number and the legal stance of IMO Member States, to consider seeking an advisory opinion from the ICJ. Evidently, this should exclusively focus on the law of the sea issues, specifically the applicability of the innocent passage right to MASS Degree IV. Such a step would indeed help prevent the emergence of divergent and contradictory state practices, thereby preserving the integrity of the innocent passage regime and the rights of coastal states.

The primary question to the Court in this instance could perhaps be formulated as whether the MASS Degree IV – i.e. ships navigating on fully autonomous mode are entitled to enjoy the innocent passage right under Part II, Section 3, Subsection A of UNCLOS. Evidently, the aforementioned question would require the ICJ's interpretation of key terms such as 'ship', 'MASS', 'remote master', and 'manning' as well as the provisions pertaining to the innocent passage regime. Moreover, to ensure the Court's flexibility in interpretation, Article 94 regarding the duties of the flag states might also be relevant when formulating the questions for the ICJ. However, this article does not propose the inclusion of the lower degrees of MASS into the formulation of the question as it was discussed elsewhere that such systems appear to fit within the framework of UNCLOS.⁷⁸

Even though one might argue that the ITLOS would be better equipped to address UNCLOS related matters, this study, while acknowledging that further investigation is required, leans towards the ICJ as a more appropriate judicial platform for several reasons. The Tribunal can issue advisory opinions on legal matters, provided that such competence is explicitly granted to it by an international agreement that is relevant to the objectives of UNCLOS, and such a request is made by

78. Sumer (n 5).

an authorised entity.⁷⁹ After all, consent is central to the jurisdiction of international courts and tribunals.⁸⁰ When an international agreement⁸¹ confers advisory jurisdiction upon the Tribunal, then the ITLOS is given competence.⁸² Although this advisory jurisdiction of the Tribunal must be expressly conferred upon ITLOS by the terms of an international agreement⁸³, this is not the case for the IMO's constituent instrument which predates UNCLOS. However, although the 1948 Convention was subject to a number of amendments over the years, even after the entry into force of UNCLOS, the last of which being the 2021 amendments⁸⁴, the IMO did not include ITLOS as a possible judicial organ to seek advisory opinions from.

Moreover, UNCLOS seems to confer a limited advisory function on the Tribunal. Unlike the ICJ, the Tribunal does not possess the overarching power to deliver advisory opinions within the UN system. Additionally, ITLOS does not serve as the judicial arm of the IMO or any other UN bodies.⁸⁵

79. Statute of the Tribunal, Article 21.

80. ITLOS Case No. 21 (n 42), written Statement of the United Kingdom.

81. Rules of the Tribunal, Article 138: "1. The Tribunal may give an advisory opinion on a legal question if an international agreement related to the purposes of the Convention specifically provides for the submission to the Tribunal of a request for such an opinion. 2. A request for an advisory opinion shall be transmitted to the Tribunal by whatever body is authorized by or in accordance with the agreement to make the request to the Tribunal."

82. ITLOS, Digest of Jurisprudence, 1996-2021, Hamburg (2021), 190-193, available at <https://www.itlos.org/fileadmin/itlos/documents/publications/ITLOS_Digest_-_TIDM_Repertoire_2021.pdf>.

83. ITLOS, A Guide to Proceedings before the International Tribunal for the Law of the Sea, Hamburg, 2016, 7, 29. Available at <https://www.itlos.org/fileadmin/itlos/documents/guide/1605-22024_itlos_Guide_En.pdf>.

84. IMO, Convention on the International Maritime Organization, available at <<https://www.imo.org/en/About/Conventions/Pages/Convention-on-the-International-Maritime-Organization.aspx#:~:text=The%20amendments%20will%20expand%20the,versions%20of%20the%20IMO%20Convention>>.

85. John E. Noyes, 'The International Tribunal for the Law of the Sea' (1999) 32 Cornell International Law Journal 1, 137.

As discussed above, it is clear that, according to the UN Charter, the Statute of the ICJ, and the IMO's constituent instrument, the ICJ can be identified as the appropriate judicial organ to deliver an advisory opinion for legal issues that cannot be addressed by the IMO. Moreover, there is a precedent for seeking an advisory opinion from the ICJ by the IMO. Furthermore, it is arguable that it is natural for a UN specialised agency (i.e. the IMO) to have recourse to another UN body, namely the ICJ. Additionally, UNCLOS does not confer any explicit role for advisory opinions to the ITLOS for maritime related UN specialised agencies, including the IMO.⁸⁶ Last but not least, considering that a number of States have yet to become parties to UNCLOS but are active members of the IMO, such states might prefer to seek recourse to the ICJ rather than the ITLOS to be more engaged in the process. Besides, one should bear in mind that several States, such as Australia, China, Ireland, Spain, the UK, and the USA, have previously asserted that the ITLOS does not enjoy general jurisdiction to render advisory opinions in the Request for an Advisory Opinion submitted by the Sub-regional Fisheries Commission (SRFC) case.⁸⁷

Nonetheless, if a coastal state were to significantly question the right of innocent passage, such as by denying passage to MASS, it is reasonable to assume that this action could escalate into a contentious political and jurisdictional issue. In such a scenario, this issue could also be brought to the IMO. Yet, it should be noted that the IMO has refrained from interpreting UNCLOS during discussions on the designation of Particularly Sensitive Sea Areas (PSSAs) in the Baltic and Western European PSSAs. In 2003, the LEG sought assistance from the UN Division for Ocean Affairs and the Law of the Sea (DOALOS) indicating that the IMO may not

86. Written Statement of Ireland, Request for an Advisory Opinion, ITLOS, Submitted by the Sub-regional Fisheries Commission (SRFC), 28 November 2013.

87. Separate Opinion of Judge Lucky, Advisory Opinion for the SRFC, 2 April 2015, ITLOS Reports 2015.

consider itself competent to interpret such a fundamental principle of the law of the sea regime.⁸⁸ Consequently, the matter could be presented as a claim before the ITLOS by the disputing parties, which was essentially established to handle disputes between the States Parties to UNCLOS.⁸⁹

5. Conclusion

The shipping sector has consistently embraced technological innovations and advancements since time immemorial. Driven by the demands for greater efficiency and enhanced operational safety, recently, the maritime sector has witnessed the development of diverse forms of automation. Nonetheless, it is vital that this progress adheres to the UNCLOS,⁹⁰ which sets forth the rights and duties of the states and ships flying their flags.⁹¹

It is crucial to ascertain how MASS can navigate safely without compromising the well-established regime of innocent passage. Additionally, it is important to ensure that the passage of MASS does not jeopardize the peace, good order, or security of the coastal States, while remaining in compliance with the rules and standards set forth in UNCLOS and the IMO treaty instruments. It is essential to recognize that MASS must operate within the legal framework established by UNCLOS. While the

88. Aldo Chircop, *MASS and Flag States: The Nexus between UNCLOS and the IMO Conventions*, 10, available at <<https://cil.nus.edu.sg/wp-content/uploads/2022/06/UNCLOS-and-maritime-autonomous-Surface-Ships-2.pdf>>.

89. Judge Lucky (n 87).

90. UNCTAD, *Maritime Autonomous Surface Ships: A critical 'MASS' for legislative review*. Available at <<https://unctad.org/news/transport-newsletter-article-no-97-fourth-quarter-2022>> accessed 10 December 2023>. See also Report of the JWG (n 18) 241.

91. Malgorzata Materna, 'Adjusting the Aperture: The International Law Case for Qualifying Unmanned Vessels as Warships' (2023) 100 INT'L L. STUD. 452, 457-458.

IMO is the appropriate body to regulate autonomous ships, it should strive to avoid possible conflicts with UNCLOS.⁹²

Arguably, the current classification of MASS is an oversimplification of the issue, especially for Degree IV. Although it has served its purpose during the RSE, it would not be sufficient for the actual regulatory stage. Therefore, a possible refinement during the deliberations on the foreseen goal-based MASS code might be useful. Indeed, one cannot possibly think of a scenario where ship owners, insurers, coastal/port/flag state authorities, or any other relevant stakeholders would be comfortable knowing that certain ships are making decisions independently, embarking and disembarking their various types of cargo, let alone passengers, without any supervision. Moreover, it is not realistic to think that such ships will sail without any monitoring in inherently difficult environments susceptible to extreme weather/sea conditions. Furthermore, even if such ships can meet certain safety conditions, one cannot forget the fact that they will be coexisting in the world's oceans with conventional manned ships for a considerable time. Thus, in light of the above, it may be advisable to merge Degree IV with Degree III as they would both be unmanned and fundamentally require remote control. This is not only a more realistic scenario, but it also facilitates a liberal interpretation of certain legal principles and concepts of the law of the sea regime. This would also prevent any tension between the well-established right of innocent passage regime and MASS Degree IV navigation.

However, if the IMO decides to keep the MASS Degree IV classification as it currently stands, and if the Member States cannot reach a consensus regarding the interrelationship between the right of innocent passage and MASS Degree IV navigation, then it may be plausible for the IMO to seek an advisory opinion from the ICJ.

92. Alexandros Ntovas, 'Functionalism and maritime autonomous surface ships', in, James Kraska and Park Young-Kil (eds.) *Emerging Technology and the Law of the Sea* (CUP, 2022) 215-216; and Sumer (n 5) 99. See also Report of the JWG (n 18).

Bridging the maritime domain awareness gap: The role of new technologies in promoting equitable surveillance capabilities to enact environmental obligations under the law of the sea*

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Abstract

In 1982, the Third United Nations Conference on the Law of the Sea expressed concerns about the potential widening technological divide between developed and developing States due to the rapid development in maritime science and technology. Over four decades later, however, the capacity gap in the field of maritime domain awareness is reportedly declining. More accessible advancements in areas such as satellite imagery, low-cost drones, and artificial intelligence contribute to democratising

* This chapter was finalised on the day of the passing of Judge Tafsir Malick Ndiaye of Senegal, member of the International Tribunal for the Law of the Sea, on Friday, the 8th of March 2024. Judge Ndiaye's contributions to international jurisprudence and academia, including research on this chapter's topic concerning marine environmental protection under the law of the sea, warrant recognition. This submission is thereby made in his honour. The views expressed in this chapter are solely those of the authors and do not necessarily reflect the views of the International Tribunal for the Law of the Sea.

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states' capabilities to cost-effectively monitor the marine environment. As this monitoring is a due diligence prerequisite of states' obligations to protect and preserve the maritime environment, more equitable capabilities present legal and ethical implications in the broader North-South international maritime and environmental discourse.

Keywords: Maritime domain awareness, Maritime surveillance, Advancements in maritime technology, Marine environmental obligations, North-South disparity

1. Introduction

The natural environment, which includes air, water, soil, flora and fauna, constitutes an essential part of life, the primary source of food, water and other resources indispensable for the existence of living beings. "The environment is not an abstraction but represents the living space, the quality of life, and the very health of human beings, including generations unborn".¹ Within this overarching natural context, the marine environment, as an element of the natural environment, stands as a cornerstone of global ecological health, which provides sustenance, biodiversity, and climatic regulation crucial for the optimal functioning of our planet.² In today's increasingly interconnected world, the imperative to protect and preserve the marine environment has attained utmost significance. This

1. *Legality of the Threat or Use of Nuclear Weapons* (Advisory Opinion) [1996] ICJ Rep 226, 242, para 29.

2. Enric Sala et al, 'Protecting the Global Ocean for Biodiversity, Food and Climate' (2021) 592 *Nature* 397, 397; Christopher C Joyner, 'Biodiversity in the Marine Environment: Resource Implications for the Law of the Sea Symposium: Biodiversity: Opportunities and Obligations' (1995) 28 *Vanderbilt Journal of Transnational Law* 635, 635-636; 638.

emphasis necessitates a closer examination of the environmental obligations enshrined in the law of the sea framework.

The theme of this volume on the intersection between maritime security, new technologies, and ethics, holding regulatory, legal, and ethical implications, resonates throughout various aspects of the law of the sea, including marine environmental obligations. A classic illustration of this interplay is observed in the historical evolution of maritime territorial sovereignty alongside advancements in cannon technology through the cannon-shot rule. This dynamic was a driving force behind the drafting, negotiation, and adoption of the 1982 United Nations Convention on the Law of the Sea (UNCLOS)³ as a new constitution for the oceans, which was intended to “take cognizance of the emergence of new technologies [in order to] formulate a new and generally acceptable convention on the law of the sea which would avoid the defects inherent in the four 1958 Geneva Conventions”.⁴ The relevance of this intersection has recently been underscored in the proceedings before the International Tribunal for the Law of the Sea (ITLOS), where the hearings of the Request for an Advisory Opinion submitted by the Commission of Small Island States on Climate Change and International Law (Case No. 31) highlighted the law of the sea’s inherent adaptability to scientific and technological advancements.⁵

3. United Nations Convention on the Law of the Sea (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 396.

4. The United Nations Third Conference on the Law of the Sea, ‘Extract from the Official Records of the Third United Nations Conference on the Law of the Sea, Volume XVII (Plenary Meetings, Summary Records and Verbatim Records, as well as Documents of the Conference, Resumed Eleventh Session and Final Part Eleventh Session and Conclusion)’ 185th Plenary meeting, A/CONF.62/SR.185, 11, 11.

5. Representative of The Democratic Republic of Congo, *Request for an Advisory Opinion submitted by the Commission of Small Island States on Climate Change and International Law (Verbatim Record)* ITLOS Case No. 31 (21 September 2023, at 10 am) ITLOS/PV.23/C31/2/Rev.1 1.

Focusing on one of the key subject matters of Case No. 31 concerning the obligations of States to protect and preserve the marine environment, this chapter examines how emerging technologies in maritime domain awareness (MDA) can transform the North-South legal and ethical perspectives, another focal point of this volume. It begins with the premise that the duty to protect and preserve the marine environment is contingent upon the due diligence of States, which in turn rests upon States' subjective capability to effectively monitor the maritime domain. Afterwards, this chapter provides an overview of the current technological advancements in areas such as satellite imagery, drone technology, machine learning, and artificial intelligence. It emphasises their cost-effectiveness, open-source nature, and accessibility. This accessibility is increasingly reducing the gap in capabilities for conducting marine environmental monitoring. It suggests that the responsibility to protect and preserve the marine environment may be interpreted more uniformly, treating UNCLOS as a dynamic instrument with evolving ethical expectations. While literature on legal obligations regarding the maritime environment grows with the timely debate surrounding Case No. 31, the 'democratising' impact of new MDA technologies on the North-South perspectives of the obligation to protect and preserve the marine environment remains underemphasised. The recognition that MDA technology trends towards increasing accessibility to the Global South challenges the prevailing notion of an ever-widening technological gap between developing and developed states.

2. Environmental obligations under the law of the sea

For this chapter, environmental obligations are conceptualised as the obligations to protect and preserve the marine environment. These ob-

ligations gained the spotlight with Case No. 31, initiated by the Commission of Small Island States on Climate Change and International Law Commission (COSIS), which represents, as the name may suggest, the States of Antigua and Barbuda and Tuvalu as original members, as well as Niue, Palau, St Lucia, Vanuatu, Saint Vincent and the Grenadines, Saint Kitts and Nevis, and the Bahamas.⁶ COSIS had requested clarification on the specific obligations under UNCLOS to prevent, reduce, and control pollution and to protect and preserve the marine environment in relation to the deleterious effects that result or are likely to result from climate change. This case has since prompted input from over 30 States, 8 international organisations, and several relevant non-governmental organisations,⁷ reacting to the necessity of ensuring “a stable and predictable ‘legal order for the seas and oceans’”.⁸ In its Preamble, UNCLOS acknowledges the importance of establish-

6. *Request for an Advisory Opinion submitted by the Commission of Small Island States on Climate Change and International Law* (Request for Advisory Opinion submitted to the Tribunal), 12 December 2022, Annual report of the International Tribunal for the Law of the Sea for 2022, 9, paras 42-45.

7. See for example, The Republic of Mauritius, Written Statement Submitted to the International Tribunal for the Law of the Sea (ITLOS Case No. 31, 16 June 2023) 21-27; The International Union for Conservation of Nature and Natural Resources (IUCN) - World Commission on Environmental Law, Ocean Law Specialist Group, Written Statement Submitted to the International Tribunal for the Law of the Sea (ITLOS Case No. 31, 13 June 2023) 20 et seq; The Democratic Republic of Congo (DRC), Observations submitted to the International Tribunal for the Law of the Sea (ITLOS Case No. 31, 13 June 2023) 35-66; Representative of the Democratic Republic of Congo (DRC), *Request for an Advisory Opinion submitted by the Commission of Small Island States on Climate Change and International Law (Verbatim Record)* ITLOS Case No. 31 (21 September 2023, at 10 am) ITLOS/PV.23/C31/16/Rev.1, 1; 19; Representative of the Pacific Community, *Request for an Advisory Opinion submitted by the Commission of Small Island States on Climate Change and International Law (Verbatim Record)* ITLOS Case No 31 (20 September 2023, at 3pm) ITLOS/PV.23/C31/15/Rev.1, 9.

8. Representative of the Commission of Small Island States on Climate Change and International Law, *Request for an Advisory Opinion submitted by the Commission of Small Island States on Climate Change and International Law (Verbatim Record)* ITLOS Case No. 31 (11 September 2023, at 3pm) ITLOS/PV.23/C31/2/Rev.1, 30.

ing a legal framework for the seas and oceans to promote peaceful uses, equitable resource utilisation, conservation of living resources, and environmental protection.⁹ Accordingly, Article 192 of the UNCLOS imposes a general obligation on States to protect and preserve the marine environment. This obligation encompasses various international duties such as due diligence, prevention of harm, prudence, and precaution,¹⁰ without allowing for any derogations, exceptions, or restrictions.¹¹ Additionally, Article 194 requires States to take all necessary measures to prevent, reduce, and control pollution of the marine environment from any source, using the best practicable means available and in accordance with their capabilities. Further provisions in UNCLOS, including Articles 196, 204, 207, 210, and 238, also contribute to the protection and preservation of the marine environment.

To understand the scope of the above obligations, it is crucial to analyse the components encompassed by the term ‘marine environment’ from both geographical and ecological perspectives.

Geographically, the marine environment includes all maritime zones governed by the law of the sea regime, i.e. those within and beyond the national jurisdiction of States. In the *Request for an Advisory Opinion Submitted by the Sub-regional Fisheries Commission (SRFC)*, ITLOS acknowledged that Article 192 of the UNCLOS “applies to all maritime areas, including those encompassed by exclusive economic zones”.¹² Similarly, the *South China Sea Arbitration* recognised that “the obligations in Part XII apply to all States concerning the marine environment in

9. UNCLOS (n 3) Preamble.

10. Translated from French text. Didillon Raphaëlle and Philippe Weckel, *L’obligation Des États de Protéger et Préserver Le Milieu Marin. Rapport Général* (Monaco Indemer 2023) 28.

11. *Ibid.*, 24.

12. *Request for an Advisory Opinion Submitted by the Sub-Regional Fisheries Commission (SRFC)* (Advisory Opinion, 2 April 2015) ITLOS Reports 2015, 4, para 120.

all maritime areas, both inside the national jurisdiction of States and beyond it.”¹³

Ecologically, the marine environment also includes all forms of marine life¹⁴ and all “living resources of the sea”,¹⁵ as it encompasses “physical, chemical, geological and biological components”.¹⁶ COSIS recently affirmed this understanding,¹⁷ referring to “the entire marine ecosystem of marine organisms and their physical environment”.¹⁸ Hence, the obligation to protect and preserve the marine environment encompasses living and non-living marine resources, together with their physical and geographical environment, in all maritime areas within and beyond national jurisdiction.

3. Maritime domain awareness as a prerequisite for fulfilling environmental obligations

In recent decades, the complexity and diversity of incidents in the maritime domain have increased. Coastal states have encountered various threats to their security, including environmental ones such as illegal,

13. *South China Sea Arbitration (Philippines v China)* (2016) ICGJ 495, PCA Case No. 2013-19, para 90.

14. UNCLOS (n 3) Article 194.

15. *Southern Bluefin Tuna Cases (New Zealand v. Japan; Australia v. Japan)* (Provisional Measures, Order of 27 August 1999) ITLOS Reports 1999, 295, para 70.

16. International Seabed Authority, ‘Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area’ (22 July 2013) ISBA/19/C/17, art 1, para 3 (c).

17. Commission of Small Island States on Climate Change and International Law (COSIS), Written Statement Submitted to the International Tribunal for the Law of the Sea (ITLOS Case No. 31, 16 June 2023) para 132.

18. *Ibid.*, para 134.

unreported, and unregulated fishing (IUU), unlawful exploitation of marine resources, and water contamination.¹⁹ This section examines MDA in the context of enforcing marine environmental obligations.

MDA is not explicitly defined by the law of the sea; instead, it encompasses a range of practices that foster a comprehensive understanding and awareness of events in the maritime domain. At its core is accurate information, intelligence, surveillance, and reconnaissance of all vessels, cargo, and people.²⁰ According to Hicks and Metrick, MDA essentially operates as an intelligence tool to develop awareness of a given maritime domain or its subcomponents.²¹

While there is no universally accepted definition of the concept, the International Maritime Organization (IMO) characterizes MDA as “the effective understanding of anything associated with the maritime domain that could impact security, safety, the economy or the marine environment.”²² Consequently, many States view MDA as essential to maritime security, facilitating the early identification of potential threats

19. For detailed information on what activities are primarily sought to be detected by MDA, see Deon Canyon and Jim McMullin, ‘Maritime Domain Awareness and Maritime Fusion Centers’ (Daniel K Inouye Asia-Pacific Center for Security Studies 2020) 2-3.

20. US Executive Office of the President, ‘Securing the Homeland, Strengthening the Nation’ (2002), <https://georgewbush-whitehouse.archives.gov/homeland/homeland_security_book.html>; See also Kathleen H Hicks and Andrew Metrick, ‘Maritime Domain Awareness: Today and Tomorrow’ (Center for Strategic and International Studies (CSIS) 2018) 12-21; Christian Bueger, ‘From Dusk to Dawn? Maritime Domain Awareness in Southeast Asia’ (2015) 37 *Contemporary Southeast Asia* 157, 157.

21. *Ibid.*, Hicks and Metrick, 12.

22. IMO, ‘Amendments to the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual (24 May 2010) MSC.1/Circ.1367 Annex, page 1.

and enhancing prevention mechanisms.²³ MDA should, therefore, be understood in a broader context that extends beyond the realm of military security. The maritime domain is not limited to the military sector; rather, it encompasses diverse activities such as civilian transport, fishing, recreational activities, violent activities at sea, natural incidents, and incidents directly damaging human health – all of which are subject to surveillance using a similar set of technologies.²⁴

Based on the understanding of MDA presented above, it is argued that it aligns with the objectives of Article 204(1) of the UNCLOS in a particular fashion. Paragraph 1 of the Article indicates that “States shall, [...], endeavour, as far as practicable, [...] to observe, measure, evaluate and analyse, by recognised scientific methods, the risks or effects of pollution of the marine environment.”

As highlighted by the Democratic Republic of the Congo (DRC) in the ITLOS Case No. 31, this provision firstly requires States to collect primary data through observation and metrology of the marine envi-

23. The White House, ‘The National Strategy for Maritime Security’ (20 September 2005) <<https://georgewbush-whitehouse.archives.gov/homeland/maritime-security.html>>; IMO, Maritime Safety Committee, 89th session, ‘Use of the Long-Range Identification and Tracking of Ships System Submitted by Canada’; UNSC, Concept note for the Security Council high-level open debate on the theme “Enhancing maritime security: a case for international cooperation”, Annex to the letter dated 26 July 2021 from the Permanent Representative of India to the United Nations addressed to the Secretary-General (27 July 2021) UN Doc S/2021/680 2; ITLOS Verbatim Records, *The M/T “San Padre Pio” Case (Switzerland v Nigeria)* (21 June 2019 3 pm) ITLOS/PV.19/C27/2/Rev.1, Representative of Nigeria 9; UNGA, 43rd Plenary meeting, UN General Assembly Official Records 74th session UN Doc A/74/PV.43 (10 December 2019) Representative of Japan 4; IMO, Sub-Committee of Navigation, 89th session, ‘Development of an E-navigation Strategy Implementation Plan, Report of the Correspondence Group, Submitted by Norway’. See also Joseph L Nimmich and Dana A Goward, ‘Maritime Domain Awareness: The Key to Maritime Security’ 83 *International Law Studies* 57, 65.

24. UNSC, Report of the United Nations assessment mission on piracy in the Gulf of Guinea (7 to 24 November 2011), Letter dated 18 January 2012 from the Secretary-General addressed to the President of the Security Council (19 January 2012) UN Doc S/2012/45, 16-17.

ronment, followed by its evaluation and analysis.²⁵ The DRC further acknowledges that due to the significance of scientific data in achieving effective protection and preservation of the marine environment, “the obligations established under Article 204 constitute a precondition for the performance [...] of the more general obligations set out in Articles 192 and 194 of UNCLOS.”²⁶

In light of the ongoing challenges in protecting and preserving the marine environment, MDA can offer comprehensive monitoring and detection capabilities to States through the use of technology. It enables monitoring of vessel movements, detection of IUU fishing activities or unauthorised pollution discharges, identification of oil spills, and monitoring changes in water quality and marine biodiversity.²⁷ MDA proves highly beneficial in detecting harmful effects or activities that may damage the marine environment. One of its main advantages lies in its capacity to facilitate timely responses to environmental threats, enabling coastal States to fulfil their obligations to protect and preserve the marine environment. For instance, in the case of oil spills or pollution discharges, MDA can play a crucial role by providing real-time information and situational awareness, thereby preventing further harm to the marine environment and mitigating adverse effects.

In summary, MDA serves as the critical link to achieving effective maritime environmental protection and maritime security through per-

25. DRC, Observations submitted to the ITLOS (n 7), para 237.

26. *Ibid.*, para 238.

27. Kamal-Deen Ali, ‘Overview of Maritime Security Challenges in the Gulf of Guinea’ in *Maritime Security Cooperation in the Gulf of Guinea* (Brill Nijhoff 2015) 88-111; ‘Policies for for Maritime Domain Awareness and Space Technology’ (The Maureen and Mike Mansfield Foundation, 25 October 2023) <<https://mansfieldfdn.org/blog/policy-recommendations-for-maritime-domain-awareness-and-space-technology>>; Heidi Vella, ‘Drones in the Deep: New Applications for Maritime UAVs’ (23 January 2018) Ship Technology <<https://www.ship-technology.com/features/drones-deep-new-applications-maritime-uavs/>>.

sistent awareness and decision superiority.²⁸ It is not merely a central component of maritime security, but also a necessary precondition to all other aspects of maritime security, and consequently, to the protection and preservation of the marine environment.²⁹

4. The due diligence nature of marine environmental obligations

The effectiveness of the techniques and technologies employed for the MDA lacks a universally defined standard expected from States to fulfil their legal obligations to protect and preserve the marine environment. This is particularly relevant given the due diligence nature of these obligations. The present section delves into the due diligence nature of obligations within the law of the sea, particularly focusing on the practical and ethical dimensions of States' capabilities in fulfilling their environmental obligations and the North-South disparities therein.

The concept of due diligence is applied in various legal domains, including the law of the sea, where it is a well-established concept of international law.³⁰ In this context, it refers to the obligation to exercise

28. Ruxandra-Laura Bosilca, 'The Use of Satellite Technologies for Maritime Surveillance: An Overview of EU Initiatives' (2016) 8 (1) INCAS Bulletin 153, 155-157; 'National Plan to Achieve Maritime Domain Awareness for the National Strategy for Maritime Security' (October 2005), ii.

29. Ifesinachi Okafor-Yarwood et al, 'Technology and Maritime Security in Africa: Opportunities and Challenges in Gulf of Guinea' (2024) 160 Marine Policy 105976, 2.

30. R Rajesh Babu, 'State Responsibility for Illegal, Unreported and Unrelated Fishing and Sustainable Fisheries in the EEZ: Some Reflections on the ITLOS Advisory Opinion of 2015' (2015) 55 Indian Journal of International Law 239, 258; *See SS Lotus case* (France v Turkey) (1927) PCIJ Ser A No 10, para 269; *Alabama Claims Arbitration* (US v Great Britain) (1872) 29 RIAA 125, 129. In *Lotus case* for example, it is stated that '[i]t is well settled that a State is bound to use due diligence to prevent the commission within its dominions of criminal acts against another nation or its people.'

reasonable care and precautions to prevent harm or mitigate potential risks in the maritime domain.³¹ Important references to the due diligence obligations of States can be found in the ITLOS Advisory Opinion of 2011 and the *Pulp Mills* case before the International Court of Justice (ICJ). Referring to the advisory opinion delivered by ITLOS, the concept, or the so-called definition of the due diligence obligation, could be as follows:

Obligation “to ensure” [...] is an obligation to deploy adequate means, to exercise best possible efforts, to do the utmost, to obtain this result. To utilize the terminology current in international law, this obligation may be characterized as an obligation “of conduct” and not “of result”, and as an obligation of “due diligence”.³²

Similarly, the ICJ in *Pulp Mills* defines due diligence as “an obligation that entails not only the adoption of appropriate rules and measures but also a certain level of vigilance in their enforcement and the exercise of administrative control”.³³

While UNCLOS does not use the phrase ‘due diligence’, the regime it establishes is “mostly based on the due diligence test”.³⁴ From the in-

31. International Law Commission (ILC), ‘Draft Articles on the Prevention of Transboundary Harm from Hazardous Activities’ (12 December 2001) A/RES/56/82, art 3; Neil McDonald, ‘The Role of Due Diligence in International Law’ (2019) 68 International & Comparative Law Quarterly 1041, 1042; 1051; Jorge E Viñuales, ‘Due Diligence in International Environmental Law: A Fine-Grained Cartography’ in Heike Krieger, Anne Peters and Leonhard Kreuzer (eds), *Due Diligence in the International Legal Order* (OUP, 2020) 111, 115.

32. *Responsibilities and obligations of States with respect to activities in the Area* (Advisory Opinion, 1 February 2011) ITLOS Reports 2011, 41, para 110.

33. *Pulp Mills on the River Uruguay (Argentina v Uruguay)* (Merits) [2010] ICJ Rep 14, para 197.

34. Francisco Orrego Vicuña, ‘State responsibility, liability, and remedial measures under international law: new criteria for environmental protection’ in E Brown Weiss (ed), *Environmental Change and International Law: New Challenges and Dimensions* (United Nations University Press, 1992) 124, 124.

terpretation of international courts and tribunals as mentioned above, it can be understood that due diligence obligations are those in which words such as ‘to ensure’, ‘all necessary, appropriate or effective measures’, ‘means at their disposal’ and ‘according to their capabilities’ are predominantly used. Considering this, most of the obligations under Part XII of the UNCLOS, i.e. general obligations related to the protection and preservation of the marine environment, are due diligence obligations. For example, the text of Article 194 employs the following wording:

States shall take, individually or jointly as appropriate, *all measures* consistent with this Convention *that are necessary* to prevent, reduce and control pollution of the marine environment from any source, using for this purpose *the best practicable means at their disposal and in accordance with their capabilities* (emphasis added), and they shall endeavour to harmonise their policies in this connection.

This approach takes into account the limited capabilities of developing States. Afterall, UNCLOS was drafted for the purpose of establishing “a just and equitable international economic order which takes into account [...] the special interests and needs of developing countries”.³⁵

Article 192, on the other hand, stands out for its unique approach to the due diligence obligations, deviating from conventional formulations observed in other provisions. The former emphasises the general obligation of States to protect and preserve the marine environment without explicitly using terms such as ‘to ensure’, ‘taking all necessary, appropriate or effective measures’, or ‘in accordance with their capabilities’. Yet, when referring to Article 192, the ITLOS Advisory Opinion of 2015 states that, as it “applies to all maritime areas, including those encompassed by exclusive economic zones, the flag State is under an obligation

35. UNCLOS (n 3) Preamble.

to ensure compliance by vessels flying its flag [...]”.³⁶

In light of these considerations, the obligations to protect and preserve the marine environment under Part XII are essentially due diligence obligations. COSIS, in Case No. 31, submitted that the provisions of Part XII entail but also go beyond due diligence obligations.³⁷ This stance was explained by arguing that UNCLOS obligations cannot be neatly categorised as either obligations of conduct or obligations of result, emphasising the importance of interpreting each provision in context to determine its meaning.³⁸

Moreover, the concept of due diligence may afford States a flexible opportunity. According to the ITLOS Advisory Opinion of 2011, “due diligence is a variable concept, [...] it may change over time as measures considered sufficiently diligent at a certain moment may become not diligent enough in light, for instance, of new scientific or technological knowledge”.³⁹ Due diligence provides flexibility for States in terms of determining which measures are necessary at the time and available within their capacities.⁴⁰ This leaves room to justify that the applied measures were necessary, appropriate, and feasible within the available capabilities to deter responsibility.

However, is it that simple to avoid State responsibility by claiming subjective belief in compliance with due diligence obligations? Papanicolopulu emphasises that meeting obligations of result can sometimes be more attainable than those of conduct (i.e., due diligence obligations),

36. ITLOS Advisory Opinion 2015 (n 12) para 120.

37. Commission of Small Island States on Climate Change and International Law (COSIS), Response to Judge Kittichaisaree’s Question (ITLOS Case No. 31, 24 September 2023) para 21 et seq.

38. Ibid., paras 23; 25-28.

39. ITLOS Advisory Opinion 2011 (n 32) para 132.

40. Hanqin Xue, ‘The Doctrine of Due Diligence and Standard of Conduct’ in *Transboundary Damage in International Law* (Cambridge University Press 2003) 162, 164.

as well as that due diligence obligations are not necessarily ‘weaker’ than the former.⁴¹

While it may seem straightforward to avoid State responsibility by demonstrating that the State has fulfilled its positive obligation, such as enacting a law in its national legislation, proving that the State has taken “all necessary, appropriate or effective” measures to meet its due diligence obligation can be challenging. For example, consider the obligation to adopt laws and regulations in national legislation to prevent, reduce, and control pollution of the marine environment from land-based sources.⁴² While this provision is formulated as an obligation of result, proving compliance with it may be more challenging if it were an obligation of conduct.⁴³

In the former scenario, a State might avoid State responsibility by showing it adopted necessary legislation. However, in the latter scenario, questions might arise regarding whether the State has taken all necessary and appropriate measures to prevent, reduce, and control pollution *per se*.⁴⁴

Due diligence obligations entail not only the adoption of appropriate rules and measures but also a certain level of vigilance in their enforcement and administrative control, as highlighted in cases such as the *Pulp Mills*⁴⁵ and the *South China Sea*. In the latter, the Arbitral Tribunal noted that adopting appropriate rules and measures to prohibit a harmful

41. Irini Papanicolopulu, ‘Due Diligence in the Law of the Sea’ in Heike Krieger, Anne Peters and Leonhard Kreuzer (eds), *Due Diligence in the International Legal Order* (Oxford University Press 2020) 147, 150.

42. UNCLOS (n 3) art 207(1).

43. What is meant by ‘obligation of conduct’ and not that ‘of result’ is that the obligation of conduct requires States to take certain actions regardless of the result achieved. *See* ITLOS Advisory Opinion 2011 (n 32).

44. Papanicolopulu (n 41).

45. *Pulp Mills* (n 33).

practice is only one component of the due diligence required by States pursuant to the general obligation of Article 192.⁴⁶

With this assertion, it becomes clear that avoiding these obligations by solely enacting national legislation, without implementing all appropriate measures, under the pretext of limited capabilities, is not a straightforward matter.

In conclusion, with a nuanced understanding of the concept of due diligence, it is evident that States are not inherently obligated to maintain comprehensive awareness of their maritime domains. Moreover, there is no objective threshold for the surveillance expected from States; these obligations are contingent upon their capabilities. This raises ethical concerns regarding the legal and regulatory framework of environmental maritime security, a theme discussed in this volume, particularly highlighting the emergence of a North-South disparity. Moving beyond these ethical considerations, the next section explores advancements in maritime surveillance capabilities enabled by new technologies.

46. *South China Sea Arbitration* (n 13) para 963. Tribunal stated that “there is no evidence in the record that would indicate that China has taken any steps to enforce those rules and measures against fishermen engaged in poaching of endangered species”.

5. New technologies bridging the gap in maritime domain awareness

5.1 North-South disparity and maritime technology

Traditionally, developing States lack the capacity for effective surveillance of their maritime domain.⁴⁷ The General Assembly recognizes this capacity gap in ocean observation and monitoring.⁴⁸ During the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea on ‘Ocean observing’, several delegations expressed concern about the deficit of developing States in conducting sufficient ocean observation.⁴⁹ This was underscored by the report of the Secretary General of the United Nations, emphasising that:

Many developing countries, in particular the least developed countries and small island developing States, lack capacity to effectively conduct ocean observations, which further impedes the expansion of the ocean observing network. These capacity gaps relate both to in-country human resources and to the financial resources necessary for instrumentation purchase, maintenance, deployment and recovery. [...] Such capacity gaps contribute to an overall gap in observations, particularly surrounding small island developing States and coastal States vulnerable to ocean change.⁵⁰

47. House of Lords, International Relations and Defence Committee, ‘UNCLOS: The Law of the Sea in the 21st Century’ (2022) 2nd Report of the Session 2021-22, para 94; Steven Haines, ‘UNCLOS: Fit for Purpose in the 21st Century?’ (2021) Written evidence UNC0037.

48. UNGA Res 76/72 (9 December 2021) UN Doc A/RES/76/72 paras 216-217.

49. ‘(First Plenary Meeting) 22nd Meeting of the United Nations Open-Ended Informal Consultative Process on Oceans and the Law of the Sea (6 June AM) | UN Web TV’ (6 June 2022) The Intervention of the delegation of Chile 1:07:00 – 1:11:00, and the intervention of the delegation of the Philippines 1:13:00 – 1:17:00.

50. UNGA Res 77/68 (28 March 2022) UN Doc A/77/68 para 30.

The Secretary General further notes that “[s]everal delegations, including one group of States, expressed concerns with respect to the limited capacity of many developing countries to effectively conduct and make use of ocean observations”.⁵¹

Nonetheless, new technologies are significantly narrowing the gap in maritime surveillance capabilities. At present, maritime surveillance relies on a combination of coastal radars, satellite observations, vessel patrols, and both manned and unmanned aerial surveillance.⁵²

The advent of technological advancements is widely recognised for offering unprecedented opportunities to enhance maritime monitoring and address complex security challenges in maritime domains.⁵³ There is a generally accepted notion that new technologies “are excellent at monitoring [and] allow a relatively inexpensive real-time view of the ocean and various areas of interest”, embodying what has been termed as ‘techno-optimism’.⁵⁴

Contemporary technologies such as drones, automatic identification systems (AIS), and satellites excel in monitoring activities, while pro-

51. UNGA ‘Report on the work of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea at its twenty-second meeting’ UNGA 77th session, UN Doc A/77/119 (24 June 2022) para 12.

52. Ilkka Tikanmäki et al, ‘Maritime Surveillance and Information Sharing Systems for Better Situational Awareness on the European Maritime Domain: A Literature Review’ in Todor Tagarev et al (eds), *Digital Transformation, Cyber Security and Resilience of Modern Societies* (Springer International Publishing, 2021) 117, 117.

53. See for example Narri Yadaiah, Nagireddy Ravi and Garnapalli Shreya, ‘Development of IoT Based Underwater Drone for Maritime Security and Surveillance’ in VH Saran and Rakesh Kumar Misra (eds), *Advances in Systems Engineering* (Springer, 2021) 667; Rabi Sharma et al, ‘Maritime Surveillance Using Instance Segmentation Techniques’ in João Manuel RS Tavares et al (eds), *Data Science and Communication* (Springer Nature, 2024) 31; Fitriana Cahyani Ardi, ‘Implementation of Integrated Maritime Surveillance System (IMSS) Technology for the Indonesian Navy in Increasing the Security of the Jurisdictional Marine Area’ (2023) 4 International Journal of Social and Management Studies 26, 26.

54. Elizabeth Nyman, ‘Techno-Optimism and Ocean Governance: New Trends in Maritime Monitoring’ (2019) 99 Marine Policy 30, 33.

viding a relatively affordable and real-time overview of the ocean and various strategic areas of interest. The evolution of satellite imagery, coupled with breakthroughs in artificial intelligence, is rapidly advancing, heralding a new era in maritime surveillance.⁵⁵ The utility of “high-tech artificial intelligence and space technologies” in environmental monitoring was recently highlighted before ITLOS in Case No. 31.⁵⁶

This revolution is particularly beneficial for States with less developed technological infrastructure, enabling them to establish effective maritime surveillance and bolster maritime security. The report of the United Nations Secretary-General on oceans and the law of the sea underscores the pivotal role of emerging technologies in enhancing the capabilities of developing nations. It emphasises that “the creation of affordable, easy-to-maintain technologies [...] could broaden participation in ocean observation, including among developing countries”.⁵⁷

Given that proficient MDA requires the collection and analysis of data, information, and intelligence, with the aim of disseminating it to relevant

55. See for example ‘Unmanned Maritime Systems (UMS)’ (The European Space Agency) <<https://business.esa.int/funding/invitation-to-tender/unmanned-maritime-systems-ums>>; Jennifer Raynor, ‘We Used AI and Satellite Imagery to Map Ocean Activities That Take Place out of Sight, Including Fishing, Shipping and Energy Development’ (*The Conversation*, 3 January 2024); Bosilca (n 28) 153-161; Nadia Proia and Vincent Pagé, ‘Maritime Surveillance with the Use of Optical Satellite Images’ (Observation des Côtes et des Océans: Senseurs et Systèmes, OCOSS 2010); H Greidanus, ‘Satellite Imaging for Maritime Surveillance of the European Seas’ in Vittorio Barale and Martin Gade (eds), *Remote Sensing of the European Seas* (Springer, 2008); Yu Wang et al, ‘Machine Learning-Based Ship Detection and Tracking Using Satellite Images for Maritime Surveillance’ (2021) 13 *Journal of Ambient Intelligence and Smart Environments* 361; Valerio Fontana et al, ‘Artificial Intelligence Technologies for Maritime Surveillance Applications’ (21st IEEE International Conference on Mobile Data Management (MDM) 2020); Zaem Shabbir, Ali Sarosh and Mahhad Nayyer, ‘Space Technology Applications for Maritime Intelligence, Surveillance, and Reconnaissance’ (2019) 17 *Astropolitics* 104.

56. *Request for an Advisory Opinion submitted by the Commission of Small Island States on Climate Change and International Law (Minutes of Public Sitzings)* ITLOS Case No. 31 (11 to 25 September 2023) 195.

57. UNGA Res 77/68 (n 50) paras 64-65.

authorities,⁵⁸ the following subsections provide an overview of technological advancements in maritime data collection and analysis. It identifies data collection as the process of capturing inputs from the undersea, surface, and aerial subcomponents of the overarching maritime domain, while data analysis involves the fusion and analysis of collected data. Traditionally, this has been done by trained human operators who possess a deep understanding of specific regional dynamics and patterns of activity. However, there is an increasing use of automated technologies for data analysis.⁵⁹

5.2 Advancements in data collection

The implementation of MDA starts with the collection of maritime data, a process greatly enhanced by technological advancements.⁶⁰ Developments in areas such as small satellites, open-source satellite imagery, and the widespread use of low-cost drones are said to have revolutionised maritime surveillance,⁶¹ leading to increased affordability and efficiency.

Satellite technology plays a long-recognised role in environmental monitoring,⁶² which also includes maritime environmental monitoring.⁶³ However, access to such technology has historically been limited to

58. UNSC Doc S/2021/680 (n 23) 2.

59. Hicks and Metrick (n 20) 20-21.

60. Organisation for Economic Co-operation and Development, 'The Ocean Economy in 2030' (OECD, 2016) 41.

61. Giovanni Soldi (et al.), 'Space-Based Global Maritime Surveillance. Part I: Satellite Technologies' (2021) 36 *IEEE Aerospace and Electronic Systems Magazine* 8.

62. Karen T Litfin, 'The Gendered Eye in the Sky: A Feminist Perspective on Earth Observation Satellites' (1997) 18 *Frontiers: A Journal of Women Studies* 26, 26; Johan Gärdebo, Agata Marzecova and Scott Gabriel Knowles, 'The Orbital Technosphere: The Provision of Meaning and Matter by Satellites' (2017) 4 *The Anthropocene Review* 44, 48.

63. UNGA 'Report on the work of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea at its twenty-third meeting' UNGA 78th session, UN Doc A/78/129 (3 July 2023) para 17.

developed States⁶⁴ capable of making substantial investments,⁶⁵ creating a hegemony that is now being challenged on multiple fronts.

Firstly, the consistent decline in the cost of space technology⁶⁶ has enabled developing States to climb the “space technology ladder”.⁶⁷ The emergence of more affordable “small satellites” offers increased “flexibility, speed of development, resiliency, low cost, and tolerance of risk in cutting edge technology”.⁶⁸

Secondly, the rapidly advancing commercial and private space industry⁶⁹ presents an opportunity for developing States to benefit from satel-

64. Barry R Posen, ‘Command of the Commons: The Military Foundation of US Hegemony’ (2003) 28 (1) *International Security* 5, 19-20; 46. Posen connects US military power with economic and technological dominance. See also, James Clay Moltz, *The Politics of Space Security: Strategic Restraint and the Pursuit of National Interests* (Stanford University Press, 2019) 31-37; Ann Florini and Yahya Dehqanzada, ‘Commercial Satellite Imagery Comes of Age’ (1999) 16 *Issues in Science and Technology* 45, 47.

65. See Theresa Hitchens, ‘Weapons in Space: A Silver Bullet or Russian Roulette? The Policy Implications of US Pursuit of Space-based Weapons’ in John Logsdon and Gordon Adams eds, *Space Weapons: Are They Needed?* (Washington, DC: Space Policy Institute, 2003); Michael Krepon and Christopher Clary, *Space Assurance or Space Dominance? The Case against Weaponizing Space* (Henry L Stimson Center, 2003) 58-74; Charles V Peña and Edward L Hudgins, ‘Should the United States “Weaponize” Space? Military and Commercial Implications’ (18 March 2002) Cato Institute, Policy Analysis No 427, 5-10.

66. Euroconsult for the UK Space Agency, ‘Commercial Space Surveillance & Tracking’ (2020) Final Report <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/917912/Euroconsult_-_Commercial_SST_Market_-_for_publication.pdf>; McKinsey & Company, ‘McKinsey Technology Trends Outlook 2022 Future of Space Technologies’ (August 2022).

67. Danielle Wood and Annalisa Weigel, ‘Charting the Evolution of Satellite Programs in Developing Countries – The Space Technology Ladder’ (2012) 28 *Space Policy* 15-24.

68. Joseph R Kopacz, Roman Herschitz and Jason Roney, ‘Small Satellites an Overview and Assessment’ (2020) 170 *Acta Astronautica* 93, 93; Simone Battistini, ‘Chapter 12 - Small Satellites for Disaster Monitoring’ in Adil Denizli et al (eds), *Nanotechnology-Based Smart Remote Sensing Networks for Disaster Prevention* (Elsevier, 2022) 231, 245.

69. USSPACECOM, *Leveraging Commercial Space* (J8 Memo to Industry, FY26 4th edition, October 2023). UN Office for Outer Space Affairs, ‘The proceedings of the Workshop on United Nations treaties on outer space: Actions at the national level’ (2004) UN Doc ST/SPACE/22, 4 (Opening statement by Kak-soo Shin).

lite surveillance capabilities without having to invest in national satellite systems.⁷⁰

In this regard, perhaps the most impactful period was the late 1990s and early 2000s, which marked a significant change with the emergence of open-source satellite imagery,⁷¹ ‘democratizing’ access to what was once a highly exclusive resource.⁷² Examples include NASA’s Landsat programme,⁷³ NASA’s Land, Atmosphere Near real-time Capability for EO (LANCE) programme,⁷⁴ NASA Worldview,⁷⁵ NASA Earth Observatory,⁷⁶ EU Copernicus/European Space Agency (ESA) Sentinel programme,⁷⁷ and Japan’s GOSAT project.⁷⁸

Technologically on par, the private sector also offers open-source initiatives like Google Earth Engine,⁷⁹ ‘Group on Earth Observations’ (GEO) and its ‘Global Earth Observation System of Systems’ (GEO-

70. J Todd Black, ‘Commercial Satellites: Future Threats or Allies?’ (1999) 52 Naval War College Review 99, 99.

71. Columba Peoples and Tim Stevens, ‘At the Outer Limits of the International: Orbital Infrastructures and the Technopolitics of Planetary (In)Security’ (2020) 5 (3) European Journal of International Relations 294.

72. Yahya Dehqanzada and Ann M Florini, ‘Secrets for Sale: How Commercial Satellite Imagery Will Change the World’ (Carnegie Endowment for International Peace 2000).

73. ‘Satellites | Landsat Science’ (NASA, 30 November 2021) <<https://landsat.gsfc.nasa.gov/satellites/>>.

74. Ibid.

75. ‘EOSDIS Worldview’ (*Worldview*) <<https://worldview.earthdata.nasa.gov/?v=-133.107740991966,-56.656891674339754,42.45673504856204,63.43938758816639&t=2024-03-07-T17%3A10%3A33Z>>.

76. ‘NASA Earth Observatory - Home’ (16 February 2024) <<https://earthobservatory.nasa.gov/>>.

77. ‘Missions - Sentinel Online’ (*Sentinel Online*) <<https://copernicus.eu/missions>>.

78. ‘GOSAT Greenhouse Gases Observing Satellite’ (*Greenhouse gases observing satellite GOSAT 'IBUKI'*) <<https://www.gosat.nies.go.jp/en/>>.

79. ‘A Planetary-Scale Platform for Earth Science Data & Analysis’ (*Google Earth Engine*) <<https://earthengine.google.com>>.

SS),⁸⁰ and DigitalGlobe.⁸¹

In the field of ocean observation, initiatives such as the OceanOPS, Ocean+, and European Digital Twin of the Ocean (European DTO), European Marine Observation and Data Network (EMODnet), continue to aim at providing open-source and accessible maritime data.⁸²

Advancements in satellite technologies as above-mentioned promote different areas of marine environmental protection. For instance, satellite technology can track and map marine pollutants,⁸³ and other atmospheric pollutants associated with marine transportation.⁸⁴ In addition to atmospheric pollution, satellite technology can also aid in the investigation of fishing activities and the monitoring of pollution resulting from oil spills. For example, “publicly available satellite data offered by NASA and the ESA provide an opportunity to actively monitor [IUU fishing]”.⁸⁵

Scientists at the U.S. National Oceanic and Atmospheric Administration (NOAA) employ the Visible Infrared Imaging Radiometer Suite (VIIRS), an instrument onboard the NASA/NOAA Suomi National Polar Partnership weather satellite, to identify and pinpoint through satellite images the illumination used by fishermen to lure

80. ‘Mission | GEO’ (*Group on Earth Observations*) <<https://earthobservations.org/>>.

81. DigitalGlobe was acquired by Maxar Technologies in 2017: ‘Maxar Is a Leading Geospatial Intelligence Company’ (*Maxar*) <<https://www.maxar.com/maxar-intelligence/about>>.

82. UNGA Res 77/68 (n 50) para 64.

83. Sidrah Hafeez et al, ‘Detection and Monitoring of Marine Pollution Using Remote Sensing Technologies’ in Houma Bachari Fouzia (ed), *Monitoring of Marine Pollution* (IntechOpen, 2018) 1, 2.

84. Saadia M Pekkanen, Setsuko Aoki and John Mittleman, ‘Small Satellites, Big Data: Uncovering the Invisible in Maritime Security’ (2022) 47 *International Security* 177, 209.

85. Patrick Beukema et al, ‘Satellite Imagery and AI: A New Era in Ocean Conservation, from Research to Deployment and Impact’ (2023) 1 <<https://openreview.net/forum?id=H-0HdmdXsTp>>.

squid and other marine life to the surface during night time.⁸⁶ Additionally, the Global Fishing Watch holds an “open-access online platform for visualisation and analysis of vessel-based human activity at sea”.⁸⁷ This could publicly reveal previously unseen vessel activity around the world.⁸⁸

Oil spill detection has long benefitted from satellite imagery, too.⁸⁹ Advancements in technology increasingly allow for the identification of responsible vessels and evaluation of their toxic effects of their activities on the marine ecosystem.⁹⁰ For instance, the Second World Ocean Assessment Report names the General National Oceanic and Atmospheric Administration Operational Modelling Environment (GNOME), a system that improves the processing of satellite imagery to predict the trajectory and fate of oil spills.⁹¹ The coding system of GNOME is free,

86. Christopher D Elvidge et al, ‘Automatic Boat Identification System for VIIRS Low Light Imaging Data’ (2015) 7 Remote Sensing 3020, 3034. Visible Infrared Imaging Radiometer Suite (VIIRS) Boat Detection is described in Christopher D Elvidge et al, ‘Rating the Effectiveness of Fishery Closures With Visible Infrared Imaging Radiometer Suite Boat Detection Data’ (2018) 5 Frontiers in Marine Science 1, 2.

87. ‘Global Fishing Watch Map User Guide’ (*Global Fishing Watch*) <<https://globalfishing-watch.org/user-guide/>>.

88. Dave Poortvliet, ‘Emerging Technology Gives First Ever Global View of Hidden Vessels’ (*Global Fishing Watch*, 8 June 2022) <<https://globalfishingwatch.org/press-release/technology-highlights-hidden-vessels/>>.

89. See Werner Alpers and Heidi A Espedal, ‘Oils and Surfactants’ in Christopher R Jackson and John R Apel (eds), *Synthetic Aperture Radar: Marine User’s Manual* (Washington, DC: NOAA, September 2004) 263–275. Alpers and Espedal cite operational use of Synthetic Aperture Radar (SAR) imagery as early as 1996 in support of the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78); See Bingxin Liu et al, ‘Tracing Illegal Oil Discharges from Vessels Using SAR and AIS in Bohai Sea of China’ (2021) 211 Ocean & Coastal Management 105783.

90. ‘Sustainable Ocean Management - Technology’ (*Global Fishing Watch*) <<https://global-fishingwatch.org/map-and-data/>>.

91. UN, ‘*The Second World Ocean Assessment*’ Volume I (New York, 2021) 289.

publicly available, and fully open-source.⁹² The Environment & Oil Spill Response is another open-source analytic tool that supports oil spill response planning.⁹³ The open-coding nature of these tools make them accessible to States of different capabilities.

Another technology to be pinpointed alongside satellite technology is low-cost commercial drones, which have emerged as a cost-effective solution for autonomous maritime surveillance. Initiatives like the MITRE Corporation's partnership with the U.S. Office of Naval Research aim to deploy autonomous drones capable of operating in dynamic ocean environments with low-power sensors and commercial electronics.⁹⁴ As MITRE's expeditionary group leader stated, instead of "a crewed asset or an expensive uncrewed asset to maintain cognizance over a wide ocean area, Hopper [drone] can do so at a fraction of the cost".⁹⁵

The US Navy has also invested in a research programme to develop such capabilities, titled Low Cost Unmanned aerial vehicle Swarming Technology, which will allow its operators to control the behaviour of the swarm, while preserving individual drone autonomy.⁹⁶ Similar to satellites or other remote technologies, drones provide "large reach over vast areas combined with their low cost make them a cheap solution for the

92. 'GNOME Suite for Oil Spill Modeling' (*Office of Response and Restoration*, 3 January 2023) <<https://response.restoration.noaa.gov/oil-and-chemical-spills/oil-spills/response-tools/gnome-suite-oil-spill-modeling.html>>.

93. 'AU Ecoscience - EOS' (Aarhus University, 21 April 2023).

94. Miriam McNabb, 'MITRE's Hopper UAV: Unleashing Unmanned Ingenuity Across Oceans' (DRONELIFE, 30 January 2024).

95. Paul O'Donnell and Denise Schiavone, 'Taking Flight: Hopper Drone Poised to Transform Maritime Missions' (*Mitre*, 26 January 2024).

96. Irving Lachow, 'The Upside and Downside of Swarming Drones' (2017) 73 (2) *Bulletin of the Atomic Scientists* 96, 98; Tuneer Mukherjee, 'Securing the Maritime Commons: The Role of Artificial Intelligence in Naval Operations' (Observer Research Foundation 2018) ref. 52.

management of large marine spaces”.⁹⁷

In sum, the ongoing advancements in data collection technologies within the maritime domain signify a trend towards more inclusive, efficient, and effective surveillance and environmental monitoring practices. This progress not only enhances MDA but also empowers States, especially those with limited resources, to better respond to environmental threats.

5.3 Advancements in data processing

The preceding sections have highlighted the advancements in data collection technologies, showcasing the sheer volume of unclassified imagery and data broadcasts available daily. These terabytes of information from global surveillance operations exceed the processing capacity of human analysts.⁹⁸ Even with vast amounts of maritime data collected inexpensively and readily, manual processing would still be impractical, as it would be time-consuming and labor-intensive.⁹⁹ This issue ties into another North-South capacity gap identified in the Secretary General’s report on ocean observations, which pertains to the availability of human resources for observation activities within each country.

Having said that, advances in computing technology, coupled with statistical approaches for analysing large datasets through machine learn-

97. Kate Bennett et al, ‘Managing Large Scale Marine Reserves: Policy Recommendations for the Global Legacy Ocean Campaign’ (2015) 52; Trent Lukaczyk et al, ‘Unmanned Aircraft as Mobile Components of Ocean Observing Systems for Management of Marine Resources’ (IEEE/MTS Oceans 2016) 1-7; Nyman (n 54) 32; *See also* Quentin Laporte-Fauret et al, ‘Low-Cost UAV for High-Resolution and Large-Scale Coastal Dune Change Monitoring Using Photogrammetry’ (2019) 7 *Journal of Marine Science and Engineering* 63.

98. Robert Cardillo, ‘Small Satellites - Big Data | National Geospatial-Intelligence Agency’ (Utah State University, Logan, Utah, 7 August 2017) <https://www.nga.mil/news/Small_Satellites_-_Big_Data.html>; Pekkanen et al (n 84) 177.

99. Nyman (n 54) 32.

ing and artificial intelligence, have improved the utility of ocean datasets.¹⁰⁰ Automated technologies now provide substantial support to human operators in analysing data collected from maritime domains,¹⁰¹ enabling the examination of vast quantities of surveillance footage¹⁰² with profound implications for environmental protection.¹⁰³

It is notable that these automated algorithms offer a more cost-effective solution than traditional human analysis.¹⁰⁴ While it is not indicated that they would completely replace human capacity, this progression continues to bridge the gap in human resources between developed and developing States, as highlighted by the Secretary-General's report on ocean observation.¹⁰⁵

In fact, research on intelligent vision-based technology at sea is ongoing to offer cost-effective enhancements over conventional, human-centric object detection, even in areas where human capabilities would still be employed.¹⁰⁶

In the context of fishing, for instance, ongoing research is examining how machine-learning algorithms can discern patterns amidst various factors such as vessel movements, islands, waves, and other noise. The aim is to detect vessels going 'dark' (e.g., turning off their tracking sys-

100. Hilde M Toonen and Simon R Bush, 'The Digital Frontiers of Fisheries Governance: Fish Attraction Devices, Drones and Satellites' (2020) 22 *Journal of Environmental Policy & Planning* 125, 125; Yu Wang et al (n 55).

101. Hicks and Metrick (n 20) 20-21.

102. Vijay Sakhuja, 'Artificial Intelligence and Maritime Domain Awareness | Society for the Study of Peace and Conflict' (11 June 2018) <<https://sspconline.org/index.php/opinion/artificial-intelligence-maritime-domain-awareness-vijay-sakhuja-110618>>.

103. Alexandru Pohontu, 'A Review over AI Methods Developed for Maritime Awareness Systems' (2020) XXIII *Scientific Bulletin of Naval Academy* 287, 287.

104. National Plan to Achieve Maritime Domain Awareness (n 28) page ii, 8.

105. UNGA Res 77/68 (n 50) para 30.

106. Rabi Sharma et al (n 53) 37.

tems) and predict which of those vessels are engaged in fishing.¹⁰⁷ The Second World Ocean Assessment reports how the use of artificial intelligence and machine learning approaches can complement other advancements in remote sensing and camera technologies, contributing to better monitoring of IUU catches. This can also improve the reporting of catches, allow for the traceability of products, reduce wastage along supply chains, and assist in improved monitoring of the movements of fishing fleets. Ultimately, this ensures more effective management of protected areas.¹⁰⁸

These developments in the field of maritime surveillance are evolving rapidly,¹⁰⁹ with the potential to “revolutionize maritime operations” by enhancing efficiency and effectiveness in data processing and interpretation.¹¹⁰ Yet, what is notable in the context of the North-South capacity

107. The xView3 data challenge is described in Sarah Bladen, ‘US Government and Non-profit Organization Host Prize Competition to Leverage the Latest Technology to Detect and Defeat Illegal Fishing’ (*Global Fishing Watch*, 22 July 2021) <<https://globalfishingwatch.org/press-release/usgovt-gfw-xview3/>>. See also, Pekkanen et al (n 84) 211.

108. UN, ‘*The Second World Ocean Assessment*’ Volume I (New York, 2021) 70-71; See also Emmanouil Detsis et al, ‘Project Catch: A Space Based Solution to Combat Illegal, Unreported and Unregulated Fishing: Part I: Vessel Monitoring System’ (2012) 80 *Acta Astronautica* 114; J Ruiz et al, ‘Electronic Monitoring Trials on in the Tropical Tuna Purse-Seine Fishery’ (2015) 72 *ICES Journal of Marine Science* 1201; Sara G Lewis and Mariah Boyle, ‘The Expanding Role of Traceability in Seafood: Tools and Key Initiatives’ (2017) 82 *Journal of Food Science* A13; Tomas Hafliðason et al, ‘Criteria for Temperature Alerts in Cod Supply Chains’ (2012) 42 *International Journal of Physical Distribution & Logistics Management* 355; Gwilym Rowlands et al, ‘Satellite Surveillance of Fishing Vessel Activity in the Ascension Island Exclusive Economic Zone and Marine Protected Area’ (2019) 101 *Marine Policy* 39.

109. Debra Werner, ‘Forecasts Call for Rapid Growth in Earth Observation Market’ [2018] *SpaceNews Magazine*; Valery Komissarov, ‘How Will the Earth-Observation Market Evolve with the Rise of AI?’ [2018] *SpaceNews Magazine*.

110. TechSur Solutions, ‘Leveraging AI/ML for Enhanced Maritime Domain Awareness With a Focus on AMVER Modernization’ (*TechSur Solutions*, 2 October 2023) <<https://techsur.solutions/leveraging-ai-ml-for-enhanced-maritime-domain-awareness-with-a-focus-on-amver-modernization/>>.

gap is that automated analytical tools and processing systems are significantly more accessible than human capacities. For instance, the Allen Institute for Artificial Intelligence (AI2), a non-profit organisation in Seattle, USA, has developed ‘SkyLight’, an initiative aimed at delivering top-quality data and analytics to support enforcement and compliance actions in reducing IUU fishing and other maritime crimes.¹¹¹ Advanced artificial intelligence technology provides developing countries with access to free monitoring and analysis software designed to process publicly available ocean monitoring data. Currently, the initiative supports the real-time monitoring efforts of over 60 countries and 308 organisations for free.¹¹²

Therefore, “with the growing accessibility of analytic tools [...] prospects for a more effective understanding of maritime activities” can be achieved more cost-effectively.¹¹³ Together with open-source data, automated algorithms processing systems can enhance the analytical capabilities of humans in the maritime domain.¹¹⁴ This presents a cost-effective approach for developing States to achieve more effective MDA.

As research continues leveraging machine learning and artificial intelligence for efficient maritime data processing, these new technologies serve as a powerful equalizer between the capabilities of developing and developed States, leading to the questions of legal and ethical implications.

111. ‘Skylight A Product of AI2: AI for Maritime Domain Awareness’ (6th High-Level Meeting on the Implementation of the Jeddah Amendment to the Djibouti Code of Conduct, 24 October 2023).

112. ‘Skylight | Home’ (*SKYLIGHT A product of AI2*) <<https://www.skylight.global/>>.

113. Pekkanen et al (n 84) 190.

114. National Plan to Achieve Maritime Domain Awareness (n 28) page ii.

6. Legal and ethical implications of technological advancements

The previous sections highlight how new and emerging technologies provide affordable and accessible capacities to States to effectively monitor the maritime domain. This would be particularly helpful for developing States to protect the marine environment within their domain from pollution, IUU fishing, and other activities causing environmental damage.

At the same time, the technological developments in capabilities could prompt ethical and potentially legal considerations towards more established objective obligations on developing States to exercise the necessary level of domain awareness by their further accessible capabilities. By understanding UNCLOS as a living instrument,¹¹⁵ it could be argued that while the drafting Parties may not have anticipated such widespread and affordable environmental obligations, rapid technological advancements could lead to a stricter interpretation of due diligence obligations.

As new capabilities such as open access satellite data and affordable processing software become increasingly accessible to all States, including developing ones, provisions like Article 194 of the UNCLOS place individual and collective obligations on States to use “the best practicable means at their disposal and in accordance with their capabilities” to reduce and control pollution of the marine environment from any source. These provisions can be broadly understood to include the use of new technologies for this purpose.

While it is understandable that developing states may be unable to invest in the massive capabilities required to conduct MDA, the increasing accessibility of affordable means of maritime surveillance could create an ethical expectation for states to take the necessary measures.

115. Jill Barrett, *Law of the Sea - UNCLOS as a Living Treaty* ((E-Publication) 2016).

It would therefore not be surprising if concrete obligations regarding maritime surveillance were recognised by ITLOS in the upcoming Advisory Opinion in Case No. Similarly, emphasis on the integration of new technologies might be requested to highlight a minimum threshold expected from states to monitor their marine environment in the upcoming United Nations Ocean Conference 2025, or in the upcoming United Nations Climate Change Conference of Parties to the Paris Agreement.

It could also be possible that the need to rely on new technologies in maritime surveillance reaches legal proceedings. In the momentum of climate litigation,¹¹⁶ currently embodied through Requests for advisory opinions have been filed before the ITLOS,¹¹⁷ ICJ,¹¹⁸ the Inter-American Court of Human Rights,¹¹⁹ a State might be held in violation of its environmental obligations. In such a case, the allegedly violating State might naturally cite its limited capabilities of monitoring the marine environment to preclude its international responsibility. In such a scenario, it would not be surprising if the analysis regarding a State's capacity to conduct MDA included how new and emerging technologies are increasingly presenting all States with the capability to conduct environmental monitoring.

In fact, it would not be surprising if the Court or Tribunal itself referred to publicly accessible data to assess the scope of the alleged violation, as such technologies have indeed made their way into legal

116. See Joana Setzer and Catherine Higham, 'Global Trends in Climate Change Litigation: 2023 Snapshot' (Grantham Research Institute on Climate Change and the Environment and the Centre for Climate Change Economics and Policy 2023).

117. See (n 7).

118. For case progress and updates, see 'Obligations of States in Respect of Climate Change; (International Court of Justice) <<https://www.icj-cij.org/case/187>>.

119. See *Request for an advisory opinion on the Climate Emergency and Human Rights (Request for an advisory opinion submitted to the Inter-American Court of Human Rights by the Republic of Colombia and the Republic of Chile)* 9 January 2023.

proceedings.¹²⁰ The arbitral tribunal used publicly available geospatial intelligence as evidence, ruling that China had breached its obligations under the respective Articles of UNCLOS concerning the protection and preservation of the marine environment. This breach was due to China's failure to prevent Chinese fishing vessels from engaging in harmful harvesting activities of endangered species.¹²¹ Additionally, China's island-building activities were found to be in violation.¹²² All of these violations were detected and proven through the use of publicly available geospatial intelligence.¹²³

To conclude, the evolving landscape of maritime surveillance and environmental protection underscores the significant legal and ethical implications of technological advancements. As new technologies become increasingly accessible, there is a growing expectation for states to fulfil their obligations under international law, particularly regarding the protection and preservation of the marine environment.

7. Conclusion

In 1982, the Third United Nations Conference on the Law of the Sea adopted the Resolution on the development of national marine science,

120. Pekkanen et al (n 84) 211; *See also* Jean Kay et al eds, 'Evidence from Space: Use of Space-Derived Earth Observation Information as Evidence in Judicial and Administrative Proceedings' (London Institute of Space Policy and Law, 2012) Document ESA-ISPL/EO 76/final, 32–34, 86–95, 158–166.

121. *South China Sea Arbitration* (n 13) para 992.

122. *Ibid.*, para 993.

123. Steven G Keating, 'Rock or Island? It Was an UNCLOS Call: The Legal Consequence of Geospatial Intelligence to the 2016 South China Sea Arbitration and the Law of the Sea' (2018) 35 *American Intelligence Journal* 101, 114.

technology, and ocean service infrastructures.¹²⁴ The Resolution raises “[awareness] of the rapid advances being made in the field of marine science and technology”.¹²⁵ Unless urgent measures are taken, “the marine scientific and technological gap between the developed and the developing countries will widen further and thus endanger the very foundations of the new regime”.¹²⁶ The Resolution, initially submitted by Peru on behalf of the Group of 77 representing the concerns of developing States,¹²⁷ made its way to UNCLOS,¹²⁸ highlighting this concern. Given the vast scope of developments in maritime science and technology over the past four decades, it is impractical for a single chapter to comprehensively evaluate the current status of this disparity. However, a focused examination, particularly in the realm of maritime surveillance, reveals that contrary to initial warnings, there has been significant progress in narrowing the technological gap among States. This suggests an evolving landscape where the capabilities of different nations in certain areas of marine science and technology are increasingly converging.

The current chapter argues that advancements in satellite technology, low-cost drones, artificial intelligence, and machine learning have significantly narrowed the technological divide between developed and developing States. With the continuous evolution of existing technologies, exemplified by the increasing availability of satellite imagery as open-

124. The United Nations Third Conference on the Law of the Sea, ‘Resolution on development of national marine science, technology and ocean service infrastructures adopted by the Conference at the 181st meeting on 30 April 1982’ (7 May 1982) UN Doc A/CONF.62/120, 176.

125. *Ibid.*

126. *Ibid.*

127. The United Nations Third Conference on the Law of the Sea, ‘Draft Resolution on Development of National Marine Science, Technology and Ocean Service Infrastructures Submitted by Peru on Behalf of the Group of 77’ (8 March–30 April 1982) UN Doc A/OONP.62/L.127, Annex I, 2.

128. UNCLOS (n 3) Annex VI.

source data, and the emergence of cost-effective commercial drones alongside sophisticated artificial intelligence and machine learning applications, the ability to conduct comprehensive maritime surveillance is no longer limited to nations with substantial technological prowess. Such advancements provide States with unprecedented opportunities to bolster their maritime surveillance and environmental monitoring capabilities, enabling all States to efficiently monitor and safeguard their maritime environments.

The legal and ethical ramifications of these technological advancements are profound. With MDA emerging as a crucial tool in fulfilling environmental obligations, new technologies not only enhance States' abilities to meet their commitments under UNCLOS but also have the potential to redefine the scope of these obligations. The full implications of continuous technological advancements in the field of maritime surveillance are yet to be uncovered as the global community strives to utilize all legal and ethical mechanisms to protect the marine environment, which forms the very foundation of our planet's health and sustainability.

Getting rescued by RoboCop?

Legal and ethical challenges of the use of extended reality in Frontex's search and rescue operations at sea

■ *Francesca Romana Partipilo**

Abstract

As clarified by a report published in July 2023 in the framework of Frontex Technology Horizon Scanning activities, Frontex is exploring the possibilities offered by the introduction of extended reality in its training and border-management activities. The report claims that the use of virtual reality, extended reality, and mixed reality in the context of Frontex's training and border-management activities, as well as search and rescue operations, may contribute to low-cost and risk-free training and enhanced situational awareness at European external borders. However, the document fails to disentangle the legal and ethical dilemmas raised by the potential use of new technologies in the context of Frontex's border work. This contribution aims to fill this gap by addressing some of the legal and ethical challenges associated with the use of extended reality in the context of Frontex' maritime operations.

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1. Introduction

In July 2023, Frontex – the European Border and Coastguard Agency – published a report assessing the potential use of extended reality (hereinafter XR) in its training and border management activities. The document, drafted in the framework of Frontex Technology Horizon Scanning activities,¹ draws from the extensive use of XR across various sectors, such as industry, research, and government. The report employs the notion of extended reality as a blanket term covering virtual, augmented, and mixed reality. The document explains that these technologies involve simulated reality, albeit relying on different underlying components. Virtual reality (VR) consists of a “fully immersive, three-dimensional digital environment that a person can interact with using special electronic equipment, such as VR headsets”, augmented reality (AR) is described as a technology “superimposing computer-generated images onto a user’s view of the real world”, while mixed reality (MR) is understood as a “combination of AR and VR which creates an environment where the physical can interact with the digital”.²

While the use of XR may substantially improve Frontex’s performance,

1. A Frontex’ research project aimed at assessing the potential and the value of advanced technology scanning capabilities. The Horizon Technology Scanning Report was devoted to XR and presented an overview of the technology, its main hardware and software components, market history and the global perspective, together with a current-state market analysis, with a focus on the EU, United States, and Asia-Pacific markets. The main applications and challenges linked to XR were also examined.

2. Frontex report, 4.

including during search and rescue (hereinafter SAR) operations, thus providing increased protection for the lives of asylum-seekers and migrants in distress at sea, the report warrants several considerations in relation to the legal and ethical challenges posed by XR technology. By way of example, the report fails to clarify how the agency will uphold the right to privacy of vulnerable individuals potentially impacted by XR. It does not identify the specific privacy risks linked to XR and the legal safeguards that should be implemented to ensure Frontex's compliance with the privacy framework it is bound to respect. Furthermore, concerns raised by the potential for violations of the non-discrimination principle due to the incorporation of algorithmic biases in XR technology are not addressed. Additionally, while the report mentions that extended reality might be used, *inter alia*, during SAR operations, to "enhance remote collaboration and information exchange between search and rescue teams and command centres by sharing live footage and annotated images and maps in real-time",³ the practical incorporation of XR in the different stages of a maritime SAR operation is not clearly detailed nor problematised. Finally, substantial ethical concerns arise due to the circumstance that, as held by many authors, virtual reality may cause the abandonment of external constraints, the loss of moral accountability, and dehumanization processes.⁴ Crucially, the (perceived) dilution of moral accountability for negative outcomes in the context of maritime SAR activities may pose considerable risks when dealing with the lives of vulnerable people in distress.

Against this backdrop, the present contribution aims to analyse the challenges raised by Frontex's use of XR during SAR operations, focusing on both the legal and ethical dilemmas raised by the potential introduction of this new technology in Frontex's maritime activities.

3. Ibid., 55.

4. John McMillan and Mike King, 'Why Be Moral in a Virtual World?' (2017) 5 Journal of Practical Ethics 30.

2. Frontex's use of new technologies in border management, training activities, and SAR operations

The growing use of drones, satellite systems, automated forms of surveillance and data collection, as well as other advanced technologies, comes as no surprise to those interested in EU border management. Nowadays, drones, radars, satellites, and other information and surveillance technologies have become crucial for managing migration into the EU.⁵ EU Member States continuously invest in sophisticated technological devices to strengthen border security,⁶ and so does Frontex. It was estimated that, since 2016, Frontex invested more than half a billion euros in unmanned aerial vehicles to surveil Mediterranean migration routes.⁷

The increasing recourse to new technologies to support European border management activities has considerable repercussions on the rights of migrants.⁸ The impact of the EU's high-tech borders on the fundamental rights of migrants and asylum-seekers has been extensively examined in scientific literature, particularly from the perspective of the exclusion of migrants from EU territory. Many authors have stigmatized the "technological regime of exclusion at the border-

5. Bruno Oliveira Martins and Maria Gabrielsen Jumbert, 'EU Border Technologies and the Co-Production of Security 'Problems' and 'Solutions'' (2019) 48 *Journal of Ethnic and Migration Studies* 1430.

6. Sarah Léonard and Christian Kaunert, 'The securitisation of migration in the European Union: Frontex and its evolving security practices' (2022) 48 *Journal of Ethnic and Migration Studies* 1417, 1420.

7. Luca Rondi, 'Frontex, Cutro è un ricordo sbiadito: sorvegliare dall'alto resta la priorità' (2024) *Altreconomia*.

8. For an overview of Frontex' responsibility under the ECHR, see Melanie Fink, *Frontex and human rights: responsibility in 'multi-actor situations' under the ECHR and EU public liability law* (Oxford University Press, 2018).

zone”.⁹ Others have addressed the transformation of the EU into a “technological fortress”,¹⁰ or a “cyber-fortress”.¹¹ Further, it was explained that the “phenomenon of cyber-surveillance and the use of security technologies act as supposedly benign yet brutal and effective filters that sort wanted from unwanted populations”.¹² Within the literature on the migration-security nexus, the “technologized border” was described as a tool for the surveillance of refugees and, at the same time, as a means to depict refugees as threats.¹³ Similarly, the use of new technologies at EU borders was identified as part of the “symbolic communication around the border, constructing it as an object under risk and therefore legitimizing the increased budget on Frontex and security”.¹⁴ It was also argued that the increasing use of surveillance and identification technologies by the EU serves the objective of “biopolitically [precluding] and [controlling] the entry of irregular migrants, refugees and asylum seekers from the Global South”.¹⁵ Likewise, it was maintained that surveillance technologies are used for both humanitarian and security purposes, both

9. Raluca Csernaton, ‘Constructing the EU’s high-tech borders: FRONTEX and dual-use drones for border management’ (2018) 27 *European Security* 175.

10. Warwick Armstrong, James Anderson (eds.), *Geopolitics of European Union Enlargement: The Fortress Empire* (Routledge 2004). Luisa Marin, ‘Is Europe turning into a ‘technological fortress’? Innovation and technology for the management of EU’s external borders: Reflections on FRONTEX and EUROSUR’ in Michiel A. Heldeweg (ed.), *Regulating technological innovation: A multidisciplinary approach* (Palgrave Macmillan UK, 2011).

11. Sanja Milivojevic, ‘Borders, technology and (im)mobility: ‘Cyber-Fortress Europe’ and its emerging Southeast frontier’ (2013) 19 *Australian Journal of Human Rights* 101; Elspeth Guild and others, ‘The Commission’s New Border Package: Does it take us one step closer to a ‘cyber-fortress Europe’?’ (2006) CEPS Policy Brief.

12. Milivojevic (n 11).

13. Dominik Winkler, ‘The political economy of bordering and the reproduction of borders in the case of Frontex’ (2023) 16 *Human Geography* 162, 170.

14. *Ibid.*, 171.

15. Joseph Pugliese, ‘Technologies of extraterritorialisation, statist visibility and irregular migrants and refugees’ (2013) 22 *Griffith Law Review* 571.

to provide protection *from* and *to* migrants at sea.¹⁶

The introduction of new technologies to manage EU external borders presents considerable challenges, particularly when such technologies impact the lives and individual freedoms of migrants and asylum-seekers. Such concerns are compounded by the inherent vulnerability of migrants involved in distress scenarios at sea. Nonetheless, it must be borne in mind that technology is neither inherently good nor bad. Instead, as argued in this contribution, the outcome of the introduction of new technologies in Frontex's border work depends on the effectiveness of the guarantees and legal safeguards put in place *before* employing such technologies.

With regard to the use of XR in the context of Frontex's activities, it should be noted that the use of VR in simulated training may contribute to enhancing learning outcomes, reducing risks, and cutting costs.¹⁷ Training professionals for rescue operations at sea is a dangerous process due to the challenging circumstances of real-life scenarios, frequently involving harsh weather conditions.¹⁸ However, it was demonstrated that immersive VR simulations may positively affect the safety conditions and outcomes of training in the maritime industry, compared to standard training proce-

16. Maria Gabrielsen Jumbert, 'Control or rescue at sea? Aims and limits of border surveillance technologies in the Mediterranean Sea' (2018) 42 *Disasters* 674.

17. Xiuwen Liu and others, 'Construct Virtual Environment for Marine Search and Rescue Simulator' (2009) *International Conference on Transportation Engineering* 1269; Xiuwen Liu and others, 'A prototype of marine search and rescue simulator' (2009) 1 *International Conference on Information Technology and Computer Science* 343; Bing Wu and others, 'Maritime emergency simulation system (MESS)-a virtual decision support platform for emergency response of maritime accidents' (2014) 4th *International Conference On Simulation And Modeling Methodologies, Technologies And Applications (SIMULTECH)* 155.

18. Anacleto Correia and others, 'Virtual Reality in Support of Maritime Rescue Training' (2020) *Advances in Human Factors and Systems Interaction: Proceedings of the AHFE 2020 Virtual Conference on Human Factors and Systems Interaction* 116.

dures.¹⁹ Moreover, VR-based simulators can ensure a full training experience for trainees without the need to use costly tools for training (e.g. parts of ships, speed boats). Thus, VR-based simulators offer an opportunity to deliver a full training experience while containing costs.²⁰

In addition, it was shown that VR safety simulations among professional seafarers resulted in significantly higher levels of enjoyment, motivation, and perceived learning compared to a personal training procedure.²¹ In fact, it was shown that the use of simulation-training based on VR technology may increase motivation, activate the brain and arouse users' interest while maintaining a positive attitude towards learning.²² Notably, through the use of XR, Frontex's personnel can practice different scenarios and improve their response capabilities while reducing the risk of physical harm during training. This is stressed in Frontex's report, where the EU Agency recognizes that XR can "increase border guards' safety during training by providing them with realistic experiences without exposing them to the risks and dangers presented in real-world border operations".²³ The document adds that "XR offers cost-effective, risk-reduced ways to train border

19. Guido Makransky and Sara Klingenberg, 'Virtual reality enhances safety training in the maritime industry: An organizational training experiment with a non-WEIRD sample' (2022) 38 *Journal of Computer Assisted Learning* 1127.

20. Steven C. Mallam and others, 'Rethinking maritime education, training, and operations in the digital era: Applications for emerging immersive technologies' (2019) 7 *Journal of Marine Science and Engineering* 428; Stephanie G. Fussell and Dothang Truong, 'Preliminary results of a study investigating aviation student's intentions to use virtual reality for flight training' (2020) 7 *International Journal of Aviation, Aeronautics, and Aerospace* 2.

21. *Ibid.*, 1135.

22. E-learning experiments have already been conducted in the context of Frontex border-management activities. For instance, the Schengen Borders Code eLearning Tool has been introduced as a novel way for border guards to learn about EU law, rules and procedures relevant to border checks. It uses the latest educational technology approaches, such as virtual reality immersive learning, mobile learning through a responsive interface, game-based learning and extensive online training. See <https://frontex.xrc.nl/>.

23. Frontex report, 50.

guards, reducing the potential for accidents and injuries and let guards develop their skills with no real-world consequences”.²⁴

XR may also play a fundamental role in the context of Frontex’s SAR activities. Maritime search and rescue involve “scanning an open water scene to achieve situational awareness and identification of objects of interest such as humans, vessels or landmarks”.²⁵ Therefore, depending on the size of the area to scan and the conditions and size of the vessels to locate, SAR at sea may become very difficult. Often in the past, Frontex’s staff and management have portrayed SAR operations as extraordinarily costly and challenging, given the vast space of the Mediterranean, the small – and unseaworthy – boats used by seaborne migrants, and the harsh weather conditions. They expressed worries that Frontex was bound to be unable to fulfill these exaggerated expectations, urging that “we also need to be realistic about it”.²⁶

Against such a complex backdrop, XR may certainly contribute to more effective SAR operations. For example, the use of XR in SAR operations may lead to enhanced situational awareness. It can provide real-time visualization of boats in distress and the superimposition of relevant data and images related, for instance, to the location of persons in distress, weather conditions, potential hazards linked to the specific rescue operation, and more. Additionally, XR devices may flag specific situations and high-priority scenarios that may be difficult to spot with the naked eye, prompting immediate action.²⁷ This might increase the

24. *Id.*

25. Susannah Soon and others, ‘Understanding head-mounted display FOV in maritime search and rescue object detection’ (2018) IEEE International Conference on Artificial Intelligence and Virtual Reality (AIVR) 116.

26. Nina Perkowski, “There Are Voices in Every Direction’: Organizational Decoupling in Frontex’ (2019) 57 *JCMS: Journal of Common Market Studies* 1182, 1189.

27. Nicolas LaLone and others, ‘A vision of augmented reality for urban search and rescue’ (2019) *Proceedings of the Halfway to the Future Symposium* 1, 3.

chances of effectively locating and rescuing people in distress while improving the safety of Frontex's personnel during complex maritime SAR activities. Notably, augmented reality is already in use for such purposes. In fact, as explained in Frontex's report, the first responder community is already utilizing AR for enhanced situational awareness, mapping vulnerable areas in towns or cities after natural disasters.²⁸

Further, the use of XR in search and rescue activities might improve remote assistance and collaboration between different teams (namely, the on-site team deployed to respond to the distress call and the command centre guiding the operation remotely). In fact, XR solutions enable command centres to provide guidance and support to the on-site teams in real time. The potential for such cooperation is stressed in Frontex's report, where it is mentioned that, during SAR operations, VR command centre headsets can be paired with AR glasses to enhance remote collaboration and information exchange between search and rescue teams and command centres by sharing live video feeds and annotated images and maps in real-time.²⁹ The document further specifies that the XR solution can also help dispatchers guide on-site teams to the precise location of the distress signal or assist in marking search patterns through enhanced mapping capabilities. This, in turn, may decrease the time spent searching for survivors, improving the likelihood of survival as well as the general outcome of rescue operations.³⁰

Building on the findings above, it is undeniable that the introduction of XR technologies may substantially improve both the training of Frontex's personnel and the outcome of Frontex's SAR operations. However, as argued in the following paragraphs, these technologies might also hide substantial legal and ethical challenges, which should be identified and

28. Frontex report, 24.

29. *Ibid.*, 55.

30. *Id.*

thoroughly addressed with a view to avoiding potential human rights violations at European external borders.

3. Legal challenges of the use of extended reality in Frontex's search and rescue operations at sea

The duty to rescue people in distress at sea is contained in several international legal instruments. The first treaty explicitly acknowledging such duty was the 1910 Brussels Convention on Salvage.³¹ After the adoption of this first treaty, a multitude of other instruments have codified the ancient maritime tradition prescribing the assistance of people in distress at sea. Today, the international legal framework on search and rescue contains security standards on a variety of aspects related to maritime safety and the protection of life at sea.³²

Article 98 of the 1982 United Nations Convention on the Law of the Sea (UNCLOS) provides that:

31. Convention internationale pour l'unification de certaines règles en matière d'assistance et de sauvetage maritimes et protocole de signature (adopted 23 September 1910, entered into force 1 March 1913) UKTS 4. For a history of the Brussels Convention on Salvage which later became the 1989 International Convention on Salvage, see Frederick J. Kenney Jr., Vasilios Tasikas, 'The Tampa Incident: IMO Perspectives and Responses on the Treatment of Persons Rescued at Sea' (2001) 12 Pac. Rim L & Pol'y J. 143, 148.

32. Several scholars agree on the fact that there is a "general tradition and practice of all seafarers and of maritime law regarding the rendering of assistance to persons or ships in distress at sea". See Myron H. Nordquist, *United Nations Convention on the Law of the Sea, 1982: A Commentary* (Martinus Nijhoff Publishers 1985) 193; Anish Joseph and Dimitrios Dalaklis, 'The international convention for the safety of life at sea: highlighting interrelations of measures towards effective risk mitigation' (2021) 5 Journal of International Maritime Safety, Environmental Affairs, and Shipping 1.

- Every state shall require the master of a ship flying its flag, in so far as he can do so without serious danger to the ship, the crew or the passengers:
- a) to render assistance to any person found at sea in danger of being lost;
 - b) to proceed with all possible speed to the rescue of persons in distress, if informed of their need of assistance, in so far as such action may reasonably be expected of him;
 - c) after a collision, to render assistance to the other ship, its crew and its passengers and, where possible, to inform the other ship of the name of his own ship, its port of registry and the nearest port at which it will call.³³

The provision implements the concept of the safety of life at sea, making it mandatory to provide humanitarian assistance at sea to any person who may be in danger, regardless of their legal status, in any circumstances, whether in times of war or peace, and in any parts of the world.³⁴ Article 98 of the UNCLOS mirrors Article 12 of the 1958 Geneva Convention on the High Seas.³⁵

The duty to save people in distress is also contained in the 1989 Salvage Convention, with Article 10 providing that: “Every master is bound, so far as he can do so without serious danger to his vessel and persons thereon, to render assistance to any person in danger of being lost at sea”. The Salvage Convention, as anticipated, can be traced back to the 1910 *Convention internationale pour l’unification de certaines règles*

33. This provision contains two separate obligations, addressed to two groups of States: the duty of flag States to oblige masters of vessels flying their flag to rescue people at danger of being lost at sea, and the duty of coastal states to establish and maintain search and rescue services.

34. Sophie Cacciaguidi-Fahy, ‘The law of the sea and Human Rights’ (2007) 2 PANÓPTICA - Direito, Sociedade e Cultura 1, 3.

35. Convention on the High Seas (adopted 29 April 1958, entered into force 30 September 1962) 450 UNTS 11. The Convention was the product of the first United Nations Conference on the Law of the Sea, held in Geneva from 24 February to 27 April 1958. For an overview; Dean, “The Geneva Conference on the Law of the Sea: What was Accomplished” (1958) 52 American Journal of International Law 607.

*en matière d'assistance et de sauvetage maritimes et protocole de signature.*³⁶ Article 10, in contrast with the provision contained in Article 98 of the UNCLOS Convention, does not mention States, rather referring to the central role of shipmasters in the implementation of the duty to render assistance at sea.³⁷ Pursuant to this provision, shipmasters are bound to render assistance, and States must put in place the necessary measures to enable shipmasters to implement such duty.

Finally, the 1979 International Convention on Maritime Search and Rescue (the so-called SAR Convention) provides that “Parties shall ensure that assistance be provided to any person in distress at sea. They shall do so regardless of the nationality or status of such a person or the circumstances in which that person is found”.³⁸ As widely accepted, today the SAR Convention represents the core of the international system for rescuing people in danger at sea.

Although the rescue of migrants at sea is not among the core duties assigned to Frontex by its founding instruments, the EU agency is obliged to render assistance to people in distress. The legal basis of this duty derives both from the above-mentioned instruments and the circumstance that the duty to rescue is codified in Frontex regulation, at Article 3(1)(b), which provides that the concept of European integrated border management (IBM) includes “search and rescue operations for persons

36. Convention internationale pour l'unification de certaines règles en matière d'assistance et de sauvetage maritimes et protocole de signature (adopted 23 September 1910, entered into force 1 March 1913).

37. Seline Trevisanut, ‘Search and Rescue operations at Sea’ in André Nollkaemper, Ilias Plakokefalos (eds.), *The Practice of Shared Responsibility in International Law* (Cambridge University Press 2017) 429.

38. Article 2.1.10 of the SAR Convention. Further, Regulation 33.1 of the SOLAS Convention provides that “The master of a ship at sea which is in a position to be able to provide assistance, on receiving a signal from any source that persons are in distress at sea, is bound to proceed with all speed to their assistance, if possible informing them or the search and rescue service that the ship is doing so”.

in distress at sea launched and carried out in accordance with Regulation (EU) 656/2014 and with international law”. Consequently, Frontex is bound by its founding regulation, Regulation (EU) 656/2014, and international law when operating a SAR mission at sea.³⁹

Before delving into legal considerations arising from Frontex’s use of XR in its maritime activities, a preliminary remark is in order. SAR operations often – if not always – include vulnerable subjects, who are entitled to specific protection both under international law and pursuant to Frontex regulation. Specifically, the latter instrument requires the EU Agency to identify vulnerable persons and unaccompanied minors.⁴⁰ In addition, Article 4 of Regulation (EU) 656/2014 – mentioned in Article 3 of Frontex regulation – prescribes that “throughout a sea operation, the participating units shall address the special needs of children, unaccompanied minors, victims of trafficking in human beings, persons in need of urgent medical assistance, disabled persons, persons in need of international protection and other persons in a particularly vulnerable situation”.

Notably, the legal concerns highlighted below may compound the vulnerable situation of people who find themselves in distress at sea. Accordingly, it could be argued that Frontex is under a legal obligation to assess the specific and enhanced risks experienced by this category of individuals. Crucially, Article 43 of the Frontex Regulation requires that special attention be given to vulnerable persons in the performance of Frontex’s tasks and in the exercise of its powers. Similarly, Frontex’s Fundamental Rights Strategy, adopted in 2021, stresses that “particular attention is to be devoted to the needs of vulnerable persons or groups

39. Francina Esteve, “The search and rescue tasks coordinated by the European Border and Coast Guard Agency (Frontex) regarding the surveillance of External Maritime Borders” (2017) 5 *Paix & Sec. Int’l* 93.

40. Frontex regulation, Article 3(1)(a).

and persons in a vulnerable situation, including children. This requires early identification, support and adequate referral as primary considerations when managing migratory flows”.

While it was shown that the use of XR in Frontex’s activities may lead to substantial benefits in terms of risk-free and low-cost training, enhanced situational awareness, and improved remote collaboration between on-site teams and command centres, the use of XR in the context of SAR operations might also pose significant legal challenges. Firstly, privacy concerns arise due to the potential for third-party capture of photos and videos. XR devices enable users to collect large amounts of personal data. Aside from technicalities linked to the processing of the collected data, a significant danger is represented by the possibility that this data is hacked and used for malicious reasons.⁴¹ Crucially, as stressed below, data leading to the identification of vulnerable individuals involved in rescue operations may be stolen from Frontex’s databases and fall into the wrong hands, with dangerous consequences on the lives of people fleeing dictatorial regimes or civil wars.⁴² In fact, stolen data may be easily used by state and non-state actors to identify and attack vulnerable people, putting their fundamental rights at stake, including the right to life and personal integrity.⁴³

Potential privacy concerns caused by Frontex’s use of XR technology are emphasized in Frontex’s report, which acknowledges that XR appli-

41. Mel Slater and others, ‘The ethics of realism in virtual and augmented reality’ (2020) 1 *Frontiers in Virtual Reality* 1, 3.

42. Similarly to what happened in the 2022 hack against the Red Cross. Massimo Marelli, ‘The SolarWinds hack: Lessons for international humanitarian organizations’ (2022) 104 *International Review of the Red Cross* 1267.

43. Francesca Romana Partipilo and Marta Stroppa, ‘Humanitarian organisations under cyber-attack: emerging threats and humanitarian actors’ responsibilities under international human rights law’ in François Delerue, Arun Sukumar and Dennis Broeders, *Responsible Behaviour in Cyberspace: Global Narratives and Practice* (Publications Office of the European Union 2023).

cations rely on and capture sensitive information, such as facial features, speech data, and other biometric data. Notably, the report also mentions that “XR has been seen to amplify existing data privacy concerns, creating novel, and often more invasive, issues for user privacy due to the scope, scale, and sensitivity of the information collected”.⁴⁴

While the exchange of data on humanitarian crises or biometric identification processes is often presented as a method to increase efficiency,⁴⁵ privacy concerns over the treatment of third country nationals’ data in the context of Frontex’s border management activities have been raised in multiple fora. Research exploring how vulnerable groups might be affected by the collection of biometrics at the external borders of the European Union has assessed that migrants’ ability to refuse the collection of their data is put into question by the increasing reliance on technological developments such as thermal imaging, biometric data, virtual reality, artificial intelligence, and unmanned aerial vehicles.⁴⁶ Further, many scholars have analysed Frontex’s biometric surveillance activities, raising alarm bells over potential violations of privacy and human rights, as well as worrying biases built into biometric surveillance systems.⁴⁷

Moreover, the European Data Protection Supervisor (EDPS), the independent supervisory authority established by Article 52 of Regulation (EU) 2018/1725, has recently conducted an audit on Frontex’s Joint Operations and the processing of personal data collected in the context of the Processing of Personal Data for Risk Analysis programme. Cru-

44. Frontex report, 8.

45. Petra Molnar, ‘Technology on the margins: AI and global migration from human rights perspective’ (2019) 8 *Cambridge International Law Journal* 305.

46. Bronagh Kieran and others, ‘Are smart walls smart solutions? The impact of technologically-charged borders on human rights in Europe’ (2019) 3 *Global Campus Human Rights Journal* 173.

47. Myriam Douo (et al.), ‘Lobbying Fortress Europe. The making of a border-industrial complex’ (2021) *Corporate Europe Observatory*.

cially, the EDPS found that Frontex does not sufficiently take into account the high vulnerability of individuals targeted for data collection.⁴⁸

Moreover, numerous non-profit organisations and charities – led by Privacy International – raised serious concerns regarding Frontex’s data gathering and data processing activities in a 2022 submission to the European Ombudsman. In the submission, the civil society organisations claimed that Frontex is under an obligation to conduct human rights risk and impact assessments, including privacy and data protection impact assessments, prior to engaging in any transfer of surveillance capabilities to third countries.⁴⁹ The organisations claimed that Frontex’s cooperation with third countries, including data-sharing, shows a lack of prior human rights risk and impact assessments.⁵⁰ As a result of the submission, the EU Ombudsman opened an inquiry on Frontex cooperation and data sharing with third countries. The EU Ombudsman suggested that Frontex should ensure that migrants give full and informed consent to interviews where their personal data might be collected. Additionally, during debriefing interviews, migrants should be treated in compliance with their right to dignity, including by providing them with information about their rights.⁵¹

It must be borne in mind that Frontex regulation⁵² foresees that, in the processing of personal data, Frontex shall respect Regulation (EU)

48. Audit Report on the European Border and Coast Guard Agency (Frontex), available at <https://edps.europa.eu/system/files/2023-05/edps_-_23-05-24_audit_report_frontex_executive_summary_en.pdf>.

49. Complaint to the European Ombudsman under Article 228 TFEU: EU transfers of surveillance capabilities to third countries, available at <https://privacyinternational.org/sites/default/files/2021-10/21.10.19_EU_Ombudsman_Complaint_Final.pdf>.

50. Complaint to the European Ombudsman, 10.

51. Decision on how the European Border and Coast Guard Agency (Frontex) ensures respect of the rights of migrants in ‘debriefing’ interviews (case 1452/2022/MHZ).

52. Regulation (EU) 2019/1896 of the European Parliament and of the Council of 13 November 2019 on the European Border and Coast Guard and repealing Regulations (EU) No 1052/2013 and (EU) 2016/1624, 14.11.2019, OJ L 295/1.

2018/1725 of the European Parliament and of the Council, on the protection of natural persons with regard to the processing of personal data by the Union institutions, bodies, offices, and agencies. In addition, Article 5 of the Frontex regulation provides that Frontex shall contribute to the uniform application of Union law, in particular the Charter of Fundamental Rights of the European Union. As known, Article 8 of the Charter enshrines the right to the protection of personal data, which must be processed fairly, for specified purposes, and on the basis of the consent of the person concerned or some other legitimate basis laid down by law. Furthermore, as stated above, Article 3 of the Frontex regulation refers to Regulation (EU) No 656/2014. Such regulation requires Frontex to respect the fundamental rights and principles recognized by Articles 2 and 6 of the Treaty on European Union and by the Charter, in particular respect for human dignity, the right to life, and the right to the protection of personal data.⁵³

Regulation (EU) 2018/1725, mentioned above, requires personal data to be processed lawfully, fairly, and in a transparent manner, and that such data is collected for specified, explicit, and legitimate purposes.⁵⁴ In addition, the regulation prescribes that the processing of personal data revealing racial or ethnic origin, and the processing of biometric data for the purpose of identifying a natural person, requires the explicit consent of the data subject.⁵⁵ It is doubtful whether the introduction of XR in Frontex' maritime operations would comply with the legal obligations to which the agency is bound pursuant to Regulation (EU) 2018/1725 and with the other obligations contained in the legal framework described above. In fact, Frontex did not detail how it would ensure that the right to privacy of migrants and asylum seekers is protected in the event of

53. Preamble of Regulation (EU) 2019/1896, paragraph 19.

54. Article 4.

55. Article 10.

SAR activities performed through the assistance of XR. For instance, it is not entirely clear how, in the context of a chaotic SAR operation, Frontex's personnel may obtain the consent of the subjects whose biometric data may be collected by XR devices.

As stated above, Frontex openly acknowledges the existence of relevant privacy risks. For example, the report mentions that AR glasses have a high potential for capturing photos and videos without the consent of third parties.⁵⁶ Scientific research has also shown that such devices pose heightened privacy and security problems for vulnerable individuals, including LGBT+ people.⁵⁷ In fact, it has been suggested that specific groups of people, such as dissenters, protesters, LGBT+ people, and innocent suspects, could face persecution or punishment if AR glasses data were used against them in certain situations.⁵⁸ Clearly, vulnerable individuals may face a higher risk when advanced technologies like AR glasses are used in border management activities.

Further, as anticipated above, Frontex acknowledges that if information collected by XR technologies is infiltrated, this could allow third parties to replicate biometric identification characteristics and use them for illegitimate purposes such as identity theft.⁵⁹ In this regard, it is worth recalling that in the event of a data breach, Frontex bears specific duties. For instance, under Article 35 of Regulation (EU) 2018/1725, mentioned above, “when the personal data breach is likely to result in a high risk to the rights and freedoms of natural persons”, Frontex “shall communicate the personal data breach to the data subject”. The communication

56. Andrea Gallardo and others, ‘Speculative Privacy Concerns About AR Glasses Data Collection’ (2023) 4 *Proceedings on Privacy Enhancing Technologies* 416.

57. *Id.*

58. *Ibid.*, 428.

59. *Ibid.*, 60.

shall describe in clear and plain language the nature of the personal data breach and contain the name and contact details of the data protection officer, the likely consequences of the personal data breach, the measures taken or proposed to be taken by the controller to address the personal data breach, including, where appropriate, measures to mitigate its possible adverse effects.

It be also be borne in mind that the Court of Justice of the European Union (CJEU), dealing with data breaches carried out by third parties (such as cyber-criminals), stressed that while “the mere fact that a personal data breach occurred does not mean that the [data controller] did not implement appropriate technical and organizational measures” to prevent such breach, “the fact that an infringement results from the behaviour of a third-party does not exempt the controller of liability and, in the context of an action for compensation, the burden of proving that the implemented technical and organizational measures are appropriate falls on the controller”.⁶⁰

Given Frontex’s poor track record regarding the protection of vulnerable individuals’ data, credible and robust safeguards against the misuse of personal data should be put in place before XR technology can be safely employed by Frontex. In particular, it will be crucial to establish appropriate data-sharing protocols to prevent unauthorized third-party access to sensitive data.

Arguably, as stated in the petition submitted to the European Ombudsman by Privacy International and other civil society organisations, Frontex is under an obligation to conduct human rights risk and impact assessments, including privacy and data protection impact assessments. The necessity to carry out a due diligence assessment derives from Frontex’s Fundamental Rights Strategy, which demands the Agency to apply “fundamental rights due diligence to all of their activities, ensuring the

60. Case C340/21 *Natsionalna agentsia za prihodite* [2024] CJEU.

highest standard of performance, assessing and mitigating the risk of violating fundamental rights from planning through monitoring and evaluation, and respecting human dignity and the principle of ‘do no harm’ with regard to the rights of those on the move”.⁶¹ In addition, the necessity to carry out a due diligence assessment also derives from the provisions in the Frontex regulation requiring the Agency to “pay particular attention to vulnerable persons”⁶² and to “take into account the special needs of persons in distress at sea and other persons in a particularly vulnerable situation”.⁶³ Furthermore, in addition to conducting a due diligence assessment of the human rights risks inherent in its operations, it could also be argued that Frontex should adopt robust cybersecurity measures as part of its protection efforts towards the human rights of vulnerable people.⁶⁴

From a strictly human rights perspective, the introduction of XR in Frontex’s activities may lead to a violation of the principle of non-discrimination. The principle of non-discrimination is found, *inter alia*, in Articles 1 and 8 of the Charter of the United Nations, Article 2(1) and 26 of the ICCPS, Article 2(2) of the ICESCR, Article 14 and Protocol 12 of the ECHR, Article 1 of the ACHR, Article 2 of the ACHPR, Article 3 of the Refugee Convention, and Article 2 of the CRC. Some treaties are entirely devoted to prohibiting certain forms of discrimination. For instance, the CERD prohibits racial discrimination while the CEDAW prohibits discrimination against women. There are also provisions in non-binding instruments of a general nature that prohibit discrimination, such as Article 2 of the UDHR. Among the soft-law instruments concerned with non-discrimination, there are documents of a specific

61. Frontex Fundamental Rights Strategy, p.6.

62. Frontex regulation, Article 43.

63. Ibid., Article 80.

64. Partipilo and Stroppa (n 43).

nature, such as the Declaration on the Elimination of All Forms of Intolerance and of Discrimination based on Religion or Belief.⁶⁵

Lastly, the principle of non-discrimination is also incorporated in the Frontex regulation, with Article 43 specifying that

while performing their tasks and exercising their powers, they shall not discriminate against persons on the basis of any grounds such as sex, race, colour, ethnic or social origin, genetic features, language, religion or belief, political or any other opinion, membership of a national minority, property, birth, disability, age or sexual orientation.

The relevance of the prohibition of discrimination in the context of the duty to rescue at sea is indisputable. Despite not explicitly mentioning such prohibition, Article 98(1) of the UNCLOS prescribes that “masters are obliged to assist and rescue *any* person in distress at sea”. Similarly, the SOLAS Convention and the SAR Convention stipulate that shipmasters must render assistance to persons in peril at sea “*regardless* of the nationality or status of [such persons] or of the circumstances in which [they are] found”.⁶⁶ The Brussels Convention for the unification of certain rules of law with respect to assistance and salvage at sea pushed the non-discrimination principle as far as establishing that assistance should be provided “to everybody, *even though an enemy*”.⁶⁷ Finally, the Guidelines on the Treatment of Persons Rescued at Sea, clarify that “all people are entitled to a right to be rescued in compliance with the principle of non-discrimination, *regardless* of their status or other conditions”.⁶⁸

⁶⁵. See Stephanie Farrior, *Equality and Non-Discrimination under International Law* (Routledge, 2017).

⁶⁶. Annex to the SOLAS Convention, chapter V, regulation 33(1) (emphasis added); Annex to the SAR Convention, § 2.1.10 (emphasis added).

⁶⁷. Brussels Convention, Article 11. Emphasis added.

⁶⁸. Maritime Safety Committee, Resolution MSC.167(78) of May 20, 2004, Guidelines on the Treatment of Persons Rescued at Sea, at 5.1.

When assessing the implications of the principle of non-discrimination on XR-supported border-management activities, the notion of algorithmic discrimination comes into play. As it is known, XR is supported by a series of enabling technologies, such as artificial intelligence.⁶⁹ The existence of algorithmic biases and the risk of discrimination arising from artificial intelligence have been widely analysed in scientific literature.⁷⁰ For example, it has been explained that the use of VR in workplace training and assessment is vulnerable to algorithmic discrimination.⁷¹ Moreover, many scholars have addressed the use of algorithmic decision-making systems in the context of cross-border mobility.⁷² In doing so, they have underlined that algorithmic association may amplify existing forms of structural discrimination,⁷³ multiplying the “socially discriminatory function” of borders.⁷⁴ Likewise, it was stressed that digital borders might limit access to fundamental rights according to potentially discriminatory factors such as race, ethnicity, language, nationality, and religion.⁷⁵

69. Dirk Reiners (et al.), ‘The combination of artificial intelligence and extended reality: A systematic review’ (2021) 2 *Frontiers in Virtual Reality*.

70. Raphaële Xenidis and Linda Senden, ‘EU non-discrimination law in the era of artificial intelligence: Mapping the challenges of algorithmic discrimination’ in Ulf Bernitz et al (eds) *General Principles of EU law and the EU Digital Order* (Kluwer Law International, 2020). Marcus Carter and Ben Eglison, ‘What are the risks of virtual reality data? Learning analytics, algorithmic bias and a fantasy of perfect data’ (2023) 25 *New media & society* 485; Channarong Intahchomphoo and Odd Erik Gundersen, ‘Artificial intelligence and race: A systematic review’ (2020) 20 *Legal Information Management* 74.

71. Marcus Carter and Ben Eglison, ‘A Critical Future of Virtual Reality: All Work and No Play’ (2021) *AoIR Selected Papers of Internet Research*.

72. Mirko Forti, ‘Addressing Algorithmic Errors in Data-Driven Border Control Procedures’ (2024) *German Law Journal* 1.

73. Dimitri Van Den Meerssche, ‘Virtual borders: International law and the elusive inequalities of algorithmic association’ (2022) 33 *European Journal of International Law* 171.

74. Matthew B Sparke, ‘A Neoliberal Nexus: Economy, Security and the Biopolitics of Citizenship on the Border’ (2006) 25 *Political Geography*.

75. Matthias Leese (et al.), ‘Data matters: The politics and practices of digital border and migration management’ (2022) 27 *Geopolitics* 5.

The impact of racial stereotypes in VR simulations has also been demonstrated by psychology scholars through practical observations. An experiment showed that race stereotypes influence people asked to distinguish weapons from harmless objects when the person holding the object/weapon is black rather than white.⁷⁶ This may indicate a profound influence of racial stereotypes in situations involving a possible weapon threat. Such observation is relevant to the significance placed on the principle of non-discrimination when utilising VR simulations in the training of Frontex's staff. In fact, if Frontex's personnel are trained with XR technology that incorporates algorithmic biases, they may internalize these biases and, in turn, unconsciously apply them in their SAR missions.

There is a concrete risk that XR may exacerbate existing racial stereotypes already "at work" in the context of Frontex's border work. In fact, racial stereotypes have already been detected in some of the activities of the EU Agency. Some authors have noted how Frontex often incorporates racial stereotypes in its risk analysis reports, the main output of the agency's knowledge production activities. A study conducted on the risk analysis report of 2016 has demonstrated that "gendered and racialized assumptions shape the problematization of migrants and migration by Frontex" and that gender and race often underpin the definition of risks at EU borders and proposed solutions.⁷⁷ In other words, according to the authors of the study, Frontex's conceptualization of risk and proposed solutions is heavily informed by gendered and racialized assumptions on migrants.

The above-mentioned considerations on the legal challenges posed by the introduction of XR in Frontex's border work do not serve the pur-

76. Anthony G Greenwald and others, 'Targets of discrimination: Effects of race on responses to weapons holders' (2003) 39 *Journal of Experimental Social Psychology* 399.

77. Saskia Stachowitsch and Julia Sachseder, 'The gendered and racialized politics of risk analysis. The case of Frontex' (2019) 7 *Critical studies on security* 107.

pose of impeding the adoption of a potentially life-saving technology. The purpose of this paragraph was rather to identify and problematize some of the features of XR technology when applied to Frontex's training and maritime activities. To complement this paragraph's arguments, the next one aims to identify some of the ethical dilemmas raised by XR technology and its application to Frontex's border work.

4. Ethical considerations

James H. Moor explains that there is a correlation between technological advancement and the social and ethical impacts of new technologies.⁷⁸ Likewise, Floridi addresses the tension between societal advancement triggered by new technologies, on the one hand, and the ethical dilemmas introduced by the same technologies, on the other hand.⁷⁹ In the context of border-control, which is relevant here, Marin explains that "technology brings in a number of ethical issues arising from the 'promise' of smart border management".⁸⁰ XR does not escape these considerations on the relationship between technological advancement and ethics. As XR becomes socially prevalent, ethical considerations surrounding its implementation become increasingly important. By way of example, it was stressed that the translation of social contacts into virtual inter-

78. James H Moor, 'Why we need better ethics for emerging technologies' (2005) 7 *Ethics and Information Technology* 111.

79. Luciano Floridi, 'Soft ethics, the governance of the digital and the General Data Protection Regulation' (2018) *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*.

80. Luisa Marin, 'Policing the EU's external borders: A challenge for the rule of law and fundamental rights in the area of freedom, security and justice? An analysis of Frontex joint operations at the southern maritime border' (2011) 7 *Journal of Contemporary European Research* 468, 470.

actions in the digital realm constitutes a technological challenge with profound but often dismissed ethical considerations and even harmful consequences.⁸¹

Arguably, when suggesting the introduction of new technologies in its training and maritime activities, Frontex should acknowledge the potential social and ethical impact of such technologies, identifying specific policies and practical safeguards to ensure that ethical dilemmas around XR do not result in violations of the human rights and dignity of people on the move. In fact, as explained by Moor, “because new technology allows us to perform activities in new ways, situations may arise in which we do not have adequate policies in place to guide us. We are confronted with policy vacuums. We need to formulate and justify new policies (laws, rules, and customs) for acting in these new kinds of situations”.⁸²

It could be argued that Frontex is not legally bound to address any ethical consequences or social impacts deriving from the introduction of XR technologies in its activities. This would not be entirely accurate. While compliance with unspecified ethical norms is not a strictly legal obligation of the Agency, Frontex is bound to respect a number of instruments that incorporate behavioural and ethical standards. For instance, in 2010, under pressure from human rights groups, Frontex adopted ethical guidelines on interceptions at sea.⁸³ These guidelines were contained in the 2010 Code of Conduct, which noted that border guards are often called upon to perform tasks that involve the consideration of ethical principles that are not normally faced during other types of police

81. Julia Ayache (et al.), ‘eXtended Reality of socio-motor interactions: Current Trends and Ethical Considerations for Mixed Reality Environments Design’ (2023) Companion Publication of the 25th International Conference on Multimodal Interaction 154, 154.

82. Moor (n 78) 115.

83. Simon Reid-Henry, ‘An incorporating geopolitics: Frontex and the geopolitical rationalities of the European border’ (2013) 18 *Geopolitics* 198.

work. As a consequence, the code was aimed at establishing “the ethical behaviour standards that guide all persons participating in Frontex’s activities”.⁸⁴

More recently, in February 2021, the Agency adopted a new Fundamental Rights Strategy – pursuant to Article 80 of the Frontex regulation – seeking to implement new standards and practices in how the agency deals with fundamental rights in its operations. The new Fundamental Rights Strategy provides that Frontex’s officials must follow the ethical and professional guidelines of the Code of Conduct applicable to all persons participating in Frontex operational activities.⁸⁵ The revised Code of Conduct specifies that “Frontex’s officials must act with professionalism and in a way which reflects the highest ethical standards in Frontex operational activities – for example, conducting themselves with tact and compassion towards vulnerable persons”.⁸⁶

Ethical obligations may also derive from Frontex’s status as a “projection” of the EU at its external borders. Manners explains that, in its relations with the outside world, the EU presents itself as a normative power that purports to “promote a series of normative principles that are generally acknowledged, within the UN system, to be universally applicable”.⁸⁷ These principles include sustainable peace, freedom, democracy, human rights, the rule of law, equality, social sol-

84. Frontex Code of Conduct, Article 1, available at <https://www.frontex.europa.eu/assets/Publications/General/Frontex_Code_of_Conduct.pdf>.

85. Frontex Fundamental Rights Strategy, available at <https://www.frontex.europa.eu/assets/Key_Documents/Fundamental_Rights_Strategy/Fundamental_Rights_Strategy.pdf>.

86. Frontex Code of Conduct, available at <https://www.frontex.europa.eu/assets/Key_Documents/Code_of_Conduct/Code_of_conduct_applicable_to_all_persons_participating_in_Frontex_operational_activities.pdf>.

87. In this regard, also see Wolff, “Border management in the Mediterranean: internal, external and ethical challenges” (2008) 21 *Cambridge review of international affairs* 253. There, it is argued that the EU has chosen a list of moral values as guiding principles of its external action.

idity, sustainable development, and good governance.⁸⁸ According to the author, the EU promotes such principles “leading by example”.⁸⁹ Arguably, Frontex – in its role of EU agency – represents the EU at its external borders. Therefore, it may be reasonably maintained that Frontex should also “lead by example”, respecting certain ethical and behavioural standards when dealing with vulnerable people, such as migrants and asylum seekers in distress at sea. Nonetheless, the report analysed in this contribution fails to acknowledge the ethical dilemmas caused by the introduction of new border security technologies based on XR. Consequently, the report does not introduce any safeguards, policies or practical constraints to overcome the potential social and ethical consequences of the introduction of XR into Frontex’s training and maritime activities.

A first significant ethical consideration is represented by the dependency on XR devices in decision making. Frontex’s report mentions that “XR technologies present promising tools and capabilities that could support [...] effective decision making” at EU external borders.⁹⁰ A pertinent question is whether such technologies may affect the cognitive processing and decision-making processes of Frontex’s personnel. It has been observed that in the past, humans were solely responsible for managing tasks and risks along the border, with a conscious mind making the final decisions. Today, with the growing reliance on technology, Frontex’s personnel are no longer solely responsible for physically managing tasks

88. Ian Manners, ‘The normative ethics of the European Union’ (2008) *International affairs* 45, 46. Also see, for an example, Article 3 TEU, which states that the EU “shall contribute to peace, security, the sustainable development of the Earth, solidarity and mutual respect among peoples, free and fair trade, eradication of poverty and the protection of human rights, in particular the rights of the child, as well as to the strict observance and the development of international law, including respect for the principles of the United Nations Charter”.

89. *Id.*

90. Frontex report, 53.

and risks along the border.⁹¹ Building on these observations, it could be argued that XR devices may serve as a filter between Frontex and the individuals who are affected by its decisions. Put differently, the introduction of XR technologies in Frontex's maritime activities could lead to a change in the Agency's staff's decision-making processes.

A fictitious scenario may serve as an example. Let us imagine a dinghy in distress in the vicinity of a Frontex unit, whereby officers are making use of XR devices. In this case, the EU regulation on Maritime Border Surveillance – Regulation (EU) No 656/2014 – lists a series of factors to be taken into account when determining the need to provide assistance, including the seaworthiness of the vessel, number of people on board, and weather conditions.⁹² In this situation, objective circumstances may require the issuance of a Mayday alert. But what if the XR devices worn by Frontex officers lead them to believe – and therefore act – otherwise? Technological devices can occasionally malfunction.⁹³ What if, in the case of malfunctioning, the over-reliance on such devices leads Frontex officers to commit a mistake? This is not completely unconceivable. The fact that VR can be an effective tool for changing people's attitudes through persuasion has been widely acknowledged.⁹⁴ Many authors have observed that “virtual embodiment can entail emotional, cognitive, and behavioural changes”,⁹⁵ and that “XR technology is highly persuasive, which

91. Kieran (n 46) 187.

92. Article 9 Regulation (EU) No 656/2014.

93. On the topic of human over-reliance on technology, see Jianjun Wu and others, ‘Safety first: The risk of over-reliance on technology in navigation’ (2022) 14 *Journal of Transportation Safety & Security* 1220. Also see Toshiyuki Inagaki and Makoto Itoh, ‘Human's overtrust in and overreliance on advanced driver assistance systems: a theoretical framework’ (2013) *International journal of vehicular technology*.

94. Luca Chittaro and Nicola Zangrando, ‘The persuasive power of virtual reality: Effects of simulated human distress on attitudes towards fire safety’ in Thomas Ploug and others (eds), *Persuasive Technology* (Springer, 2010).

95. Mel Slater (et al.), ‘The ethics of realism in virtual and augmented reality’ (2020) *Frontiers in Virtual Reality* 1.

allows it to exert its benefits (e.g. training for disaster response in a virtual setting is a form of persuasion)".⁹⁶ Accordingly, it was rightly explained that XR, as a digital behavioural technology, must account for the legal and moral consequences implied in changing someone's actions.⁹⁷

In addition to issues of "technological persuasion" and to potential shifts in the decision-making processes of Frontex' personnel, the use of XR may give Frontex' officials (e.g. agents in the command centres) the erroneous impression that they are exempt from the practical consequences of their actions and decisions. The "inherent isolation of the human factor from the governance of borders"⁹⁸ may thus result in a moral detachment from the decisions adopted by Frontex's personnel at sea.

As explained by McMillan and King, virtual worlds may lead to non-identifiability and, therefore, non-accountability for actors in virtual worlds.⁹⁹ Similarly, some authors have argued that rendering others as virtual avatars can trigger dehumanization processes.¹⁰⁰ Others have explained that the moral disengagement from reality brought about by XR technology may lead people to normalize inhuman actions towards others because the interactions happen virtually and are "not real".¹⁰¹ Clearly, the moral detachment from decisions taken in distress theatres, as well as the process of dehumanization of people in danger, would represent a considerable danger for the respect of the rights of migrants on the move in the Mediterranean. In the first place, such a dehumanization process may violate the inherent dignity of migrants and asylum-seekers.

96. Id.

97. Carl Boel (et al.), *Extended reality – Opportunities, success stories and challenges (health, education) – Final report* (Publications Office of the European Union, 2023).

98. Raluca Csernatoni, 'Constructing the EU's high-tech borders: FRONTEX and dual-use drones for border management' (2018) 27 *European Security* 175, 176.

99. McMillan and King (n 4).

100. Ayache, Bieńkiewicz, Richardson, and Bardy (n 81) 156.

101. Boel (et al.) (n 97) 58.

In addition, it is almost trite to observe that the protection of vulnerable people involved in distress incidents at sea relies, *inter alia*, on the accountability of Frontex and national border guards for their actions or omissions. Therefore, Frontex should ensure that its personnel do not feel “morally disengaged” from decisions taken in the context of XR-supported SAR operations. With this in mind, it will be crucial to introduce clear guidelines and protocols to ensure accountability and transparency in the use of XR technologies in Frontex’s SAR activities.

In addition, as stressed in the previous paragraph, it may be difficult for Frontex’s personnel to adequately counter biases against certain groups of people – based on gender, ethnicity, race, etc. – which are sometimes incorporated in software and algorithms underlying new technologies.¹⁰² In addition to algorithmic biases, issues of discrimination may also derive from the introduction of XR in Frontex training activities. For example, it was explained that XR training may convey the wrong idea that a certain group of people is responsible for a certain event in XR. There might have been an event in XR where a participant had a negative interaction with a representative of a certain group of people (e.g. a representative of a particular ethnicity or gender). Although this event only happened in the context of XR training, the participant in the training might internalize such an event and generalize its consequences.¹⁰³ As a result of this process of internalization, Frontex’s agents may subconsciously assume that real people belonging to the same group have bad intentions, or are not in immediate need of assistance during a real-life SAR operation (e.g., men, who are generally thought to be stronger than women).

102. Ashraf Khalil (et al.), ‘Investigating bias in facial analysis systems: A systematic review’ (2020) IEEE Access.

103. Mohsen Masoumian Hosseini and others, ‘Ethical Dilemmas of Mixed and Extended Reality’ (2023) 22 Journal of Medical Education.

Crucially, the ethical concerns generated by the introduction of virtual, mixed or augmented reality in Frontex's SAR activities may compound existing dilemmas linked to the activities of the EU agency at EU borders. Many scholars have stressed how the treatment of migrants by Frontex's personnel at EU external borders often leads to violations of basic human rights.¹⁰⁴ Therefore, it is of utmost importance to put in place adequate guarantees and procedures to ensure that the inclusion of XR in SAR activities would not exacerbate the existing vulnerabilities of migrants and asylum-seekers (e.g., by incorporating biases inherent in the functioning of these new technologies or by leading to a moral detachment of Frontex's personnel from the consequences of their actions on a SAR scene).

5. Conclusion

Undoubtedly, the introduction of XR – understood as an umbrella term encompassing virtual reality, mixed reality, and augmented reality – in Frontex's training and maritime activities presents multiple advantages. It can improve the preparedness of Frontex's personnel by providing low-cost and risk-free training activities, strengthening the control of EU external borders, and enhancing Frontex's situational awareness and overall efficiency during maritime SAR activities. At the same time, the consist-

104. Izabella Majcher, 'Human Rights Violations During EU Border Surveillance and Return Operations: Frontex's Shared Responsibility or Complicity?' (2015) *Silesian Journal of Legal Studies* 45; Katja Franko Aas, Helene O. I. Gundhus, 'Policing humanitarian borderlands: Frontex, human rights and the precariousness of life' (2015) 55 *British journal of criminology* 1; Lena Karamanidou and Bernd Kasperek, 'Fundamental Rights, Accountability and Transparency in European Governance of Migration: The Case of the European Border and Coast Guard Agency FRONTEX' (2020) *Global Migration: Consequences and Responses – Working Paper Series*.

ent integration of new technologies in the management of EU external borders is a symptom of the growing securitization of migration towards Europe. Against this backdrop, the contribution identified some of the privacy, human rights, and ethical concerns arising due to the introduction of XR in Frontex's training and maritime activities. Other legal and ethical dilemmas surrounding Frontex's use of new technologies may be explored in the future as academic research further investigates the topic. The observations presented in this contribution aim to open potential lines of research and highlight some of the problematic aspects associated with the use of XR in the context of Frontex's activities. In conclusion, the contribution suggests that the potential introduction of XR in Frontex's border and maritime activities should be further problematised so that legal and ethical challenges can be identified and adequately addressed through the introduction of specific policies and legal safeguards.

Managing migration in the Mediterranean Sea: From mythology to remote surveillance, the compatibility of the Italian strategy with international law of the sea

■ *Giorgia Bevilacqua**

1. Introduction

Examining migration trends in the Mediterranean Sea from a global perspective could lead us to the conclusion that Aeneas also left traces of himself and his journey in the legal world, as well as in that of art and literature. If we focus in particular on instruments of international law, it can be seen that those that regulate the phenomenon of migration, in the awareness that the journey brings us not only a wealth of knowledge but also dangers and adversities, are multiple and diverse.

Consider firstly the Declaration proclaimed in New York by the United Nations General Assembly in the aftermath of the two world wars of the so-called short century,¹ where the possibility of leaving any country, including one's own, became a genuine right, universally recognised for

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1. We borrowed the expression used by the British historian Eric Hobsbawm to refer to the events of the 20th century in his famous book entitled 'The Short Century'.

each individual.² A few years later, in 1951, the Geneva Convention relating to the Status of Refugees also included the importance of providing protection to those who flee for justified fear of being persecuted on the grounds of race, religion, nationality, membership of a particular social group or political opinion.³ Other international treaties, on the other hand, take into account the dangers and adversities faced by those who, more or less voluntarily, travel by sea, just like Aeneas. We refer here, above all, to the United Nations Convention on the Law of the Sea (the Montego Bay Convention), where provisions regarding the exercise of police powers in relation to suspicious foreign ships coexist with provisions aimed at safeguarding the safety of ships, crews and passengers.⁴ While on the subject of maritime safety, it should be recalled that two other specific conventions concern, respectively, safeguarding human life at sea (the SOLAS Convention)⁵ and regulating search and rescue activities (the SAR Convention).⁶

Regulating migration by sea, however, also exposes legal practitioners to a number of issues that are not easy to resolve. If, on the one hand, international cooperation can lead to the adoption of agreements aimed at regulating global phenomena such as migration, which clearly involve the interests of several states, on the other hand, implementing the commitments resulting from such cooperation into national law can be very complex. From this perspective, it is beyond doubt that the case of Italy

2. Article 13 of the Universal Declaration of Human Rights, proclaimed by the General Assembly of the United Nations, in Paris, on 10 December 1948 in Resolution 217 A, UN Doc. A/810 (1948), 71.

3. Convention relating to the Status of Refugees, adopted in Geneva on 28 July 1951.

4. United Nations Convention on the Law of the Sea, adopted in Montego Bay on 10 December 1982.

5. SOLAS Convention, adopted on 1 November 1974 by the International Conference on Safety of Life at Sea convened by the International Maritime Organisation.

6. SAR Convention, adopted in Hamburg on 27 April 1979.

is particularly complex. The geographical characteristics of the Italian peninsula, which, with over 7,000 kilometres of coastline, extend into the heart of the Mediterranean Sea, have made it, since ancient times, a territory greatly affected by the phenomenon of migration by sea. Moreover, since the uprisings that have become known as the Arab Spring, migratory flows from the North African coast have increased markedly. Statistics released by the United Nations High Commissioner for Refugees (UNHCR) show that over the past eight years, more than 2.3 million migrants and refugees have crossed the Mediterranean Sea to reach the southern shores of the European continent.⁷

That said, the various governing bodies of Italy have resorted to a number of measures in an attempt to cope with the increase in migration flows.⁸ In some cases, these have been innovative and effective solutions. In other cases, however, a questionable and short-sighted security-based logic has prevailed. In view of this complicated background, which is still in the process of being defined, it is considered necessary to analyse Italy's strategy for managing migratory pressure on its southern coasts. To this end, we will begin with a detailed description of the most important choices made by Italy, individually and within the institutional framework of the European Union (EU) (Section 2). Given the perspective of the analysis, we will look at the compatibility of such choices with the complex set of rules of international law of the sea which give rise to a series of very precise obligations for Italy, both as a coastal State and as

7. United Nations, *High Commissioner for Refugees* (UNHCR).

8. The increase in migratory flows towards Italy has had a major impact on the Italian legal system, the first reaction of which was to declare a state of humanitarian emergency. See Decree of the President of the Council of Ministers, *Declaration of the state of humanitarian emergency in the national territory in relation to the exceptional influx of citizens from North African countries* (*Dichiarazione dello stato di emergenza umanitaria nel territorio nazionale in relazione all'eccezionale afflusso di cittadini appartenenti ai paesi del Nord Africa*) No. 11A02242, 12 February 2011, in the Italian Official Journal (*Gazzetta Ufficiale*) General Series No. 42 of 21-02-2011.

a flag State. Special attention will be dedicated to the assessment of the ethical and legal implications deriving from the use of new technologies for controlling migration flows at the main EU external sea border (Section 3).

2. Managing migration flows: From maritime patrolling to remote surveillance

It is perhaps well-known by now that handling migration in the Mediterranean Sea involves two challenges: action must be taken against suspected traffickers and smugglers, and against migrants whose lives are in grave danger. The measures adopted by Italy to address this dual challenge are many and varied. For ease of explanation and analysis, these measures are analysed below in four phases.

2.1 The humanitarian crisis and the proactive intervention of the Italian authorities in relief and law enforcement activities

The first phase began with a very specific date that is engraved in our collective memory: 3 October 2013. On this date, over 360 people lost their lives in a single shipwreck a few nautical miles from the island of Lampedusa. However, this event was destined to be memorable for another reason: it triggered significant reactions from Italian institutions, first and foremost in terms of safeguarding human life at sea.

In fact, it led to the now well-known *Mare Nostrum*: a military operation, purely humanitarian in nature, which was established by the Italian government on 18 October 2013. Although the operation was

coordinated by the Italian Navy, it involved several national and European authorities. These air and sea forces patrolled a very large part of the Mediterranean Sea, stretching well beyond the outer limits of Italian territorial waters, mainly in order to rescue migrants from Libya and then disembark them in Italy.⁹ More than 150,000 people were rescued as a result of this operation. Yet, it was a victim of its own success and ended on 31 October 2014. Both Frontex and domestic political opposition believed that *Mare Nostrum* itself was actually causing migration to increase. The argument was that migrants were induced to leave the Libyan coast due to the high probability of being intercepted and rescued by the Italian authorities in a large sea area.

In this first phase, humanitarian search and rescue (SAR) initiatives coexisted with lesser-known law enforcement activities to counter migrant smuggling. The coordination of these initiatives was entrusted to the Italian Anti-Mafia Directorate (*Direzione Nazionale Antimafia* or “DNA”) at the instigation of the regions – which are governed by the District Directorates (*Direzioni Distrettuali*) – mostly affected by the management of the landings: Reggio Calabria, Lecce, and, above all, Catania). Following a request to act by the aforementioned District Directorates, the DNA proceeded to prepare guidelines (*atto di indirizzo*)¹⁰ addressed to District Prosecutors’ Offices and to judicial police bodies to coordinate the intervention of Italian air-naval units in international waters, if the offence notified concerned criminal association¹¹ and if the latter was aimed at aiding and abetting illegal

9. For a more in-depth look at the authorities involved and the *modus operandi* of *Mare Nostrum*, see the dedicated section of the Navy website: <https://www.marina.difesa.it/cosa-facciamo/per-la-difesa-sicurezza/operazioni-conclude/Pagine/mare-nostrum.aspx>.

10. DNA, Guidelines, 2014.

11. Under Article 416(6) of the Italian Criminal Code.

immigration.¹² Basically, if the criminal conduct led to the presumption of a connection with the territory of the Italian State, the plan was to intervene in international waters as well, both against mother ships and minor vessels. Several hundreds of suspected traffickers have been arrested in this period in compliance with the contents of the DNA's guidelines.

2.2 The involvement of non-governmental organisations and European authorities

The starting point of the second phase was the discontinuation of *Mare Nostrum*, which had a series of significant consequences in terms of the management of migration flows in the Mediterranean. While Italy remained committed to both SAR and law enforcement activities, both its role and its contribution changed with respect to the two types of activity.

As regards SAR, the institutional vacuum post-*Mare Nostrum* was filled by the intervention of private air and sea vessels, mostly operated by non-governmental organisations (NGOs) of different nationalities. In this phase, NGO crews patrolled the areas of sea where most distress events occurred, provided first aid and, if sufficiently equipped, transferred rescued persons to a safe landing place which, in most cases, was an Italian port.¹³ The area covered by the private units roughly corre-

12. Referred to in Article 12.3 of the Legislative Decree of 25 July 1998, no. 286, Consolidated text on the law of immigration and rules concerning the status of foreigners (*Testo unico delle disposizioni concernenti la disciplina dell'immigrazione e norme sulla condizione dello straniero*), the so-called consolidated text on immigration, in the Italian Official Journal (*Gazzetta Ufficiale*) of 18 August 1998, no. 191. Among the extensive literature, see Seline Trevisanut, *Immigrazione irregolare via mare diritto internazionale e diritto dell'Unione europea* (Jovene, 2012) 187 ss.

13. On the subject of safe place of disembarkation, according to Chapter 3.1.9 of the Annex to the SAR Convention: "[States] Parties shall co-ordinate and co-operate to ensure that masters of ships providing assistance by embarking persons in distress at sea are released from their obligations with minimum further deviation from the ships' intended voyage, provided that releasing the master of the ship from these obligations does not further endanger the safety of life at sea". In this regard, see Adele del Guercio, 'Is It Lawful to Save Human Lives at Sea?' (2022) *Federalismi.it*, ISBN 1826-3534, 53-75.

sponded to that in which those coordinated by the Navy had previously operated, extending from Italian territorial waters to the border of those of Libya, where no governmental SAR service existed either. In this second phase, however, rescue coordination reverted to the Coast Guard.¹⁴

With regard to activities to counter migrant smuggling, in this second phase, Italy actively contributed to patrolling the Mediterranean Sea, taking part in both police operations coordinated by Frontex and a full-fledged military operation. The first in a long series of police operations was called Operation Triton. Officially launched on 1 November 2014, Operation Triton was the result of a compromise reached between European institutions and the Italian government, which hoped that, after *Mare Nostrum* ended, it would be continued at the European level. Its mandate and the broader one of the subsequent Operation Triton Plus, however, remained focused on the protection of the EU's external maritime border and were far from being humanitarian operations.¹⁵ The next operation in which Italy also actively participated was called EU-NAVFOR MED. Military in nature, it was set up within the framework of the *Common Foreign and Security Policy* (CFSP)¹⁶ on 18 May 2015 and aimed to 'disrupt the business model of smugglers in the Southern Central Mediterranean'.¹⁷ Initially, its mandate appeared to be particu-

14. On non-governmental rescue, see Eugenio Cusumano, 'Emptying the Sea with a Spoon?' (2017), *Marine Policy* Vol 75, January 2017, 91-98.

15. See Frontex Annual Report on the Implementation of Regulation 656/2014, Warsaw, 9 July 2015, [tp://frontex.europa.eu/assets/About_Frontex/Governance_documents/Sea_Surveillance/Sea_Surveillance_report_2014.pdf](http://frontex.europa.eu/assets/About_Frontex/Governance_documents/Sea_Surveillance/Sea_Surveillance_report_2014.pdf). On Operation Triton, see also: 'Frontex launches joint operation Triton', January 2017.

16. European Parliament, 'Politica Estera: obiettivi, strumenti e risultati', available at <<https://www.europarl.europa.eu/factsheets/it/sheet/158/politica-estera-obiettivi-strumenti-e-risultati-conseguiti>>.

17. Council Decision (CFSP) 2015/778 of 18 May 2015 on a European Union military operation in the Southern and Central Mediterranean (EUNAVFOR MED), in OJ L 122/31 of 19 May 2015. See in particular Art. 1 and Recital (5).

larly ambitious: the air-naval units involved could carry out detentions, inspections, seizures, and hijackings. They could also take all necessary measures against vessels and related means suspected of being used for people smuggling and trafficking, both in international and Libyan territorial waters. The carrying out of such actions within Libyan waters was, however, subject to a UN Security Council resolution or the consent of the Libyan state.¹⁸ The resolution was adopted, but it only authorised the use of police powers in international waters. Libyan consent, on the other hand, was never given.

As regards the results achieved in this phase, the Italian Coast Guard reports for 2016 made no distinction between when Frontex and EU-NAVFOR MED assets intervened for law enforcement activities and when they intervened for SAR activities. Nevertheless, it is clear from the same reports that the number of people actually rescued using governmental resources was overall much lower than the number rescued by non-governmental units.¹⁹

2.3 Towards the reduction of responsibility and the regularisation of irregular flows

The year 2017 marked the beginning of a longer phase in which Italy gradually moved away from having any responsibility for migration management in the Mediterranean Sea. Although the increase in flows from Libya and, later on, from Tunisia too, continued unabated, several of Italy's governing bodies distanced themselves from the need to inter-

18. CFSP Decision, Art. 2. On this topic, Laura Salvadego, 'Il rispetto dei diritti umani fondamentali nel contrasto al traffico di migranti' (2017) *Il Diritto Marittimo*, CXIX, Berlingieri, 1122-1150.

19. General Command of the Italian Harbour Master - Coast Guard Body, *Attività nel Mediterraneo Centrale*, 2017, available at <https://www.guardiacostiera.gov.it/attivita/Documents/attivita-sar-immigrazione-2017/Rapporto_annuale_2017_ITA.pdf>.

vene at sea in both SAR and law enforcement activities. At least three circumstances demonstrate this trend.

Firstly, in early 2017, Italy officially reactivated cooperation with the Libyan authorities and signed a genuine bilateral treaty delegating SAR initiatives to the Libyan Coast Guard. In 2020, over 11,900 people were intercepted by these authorities and returned to Libya.²⁰ Although the requirements set by the IMO to establish a SAR zone were still lacking and, above all, although Libya is not considered a safe country,²¹ this agreement has been regularly renewed to date.²²

Secondly, the interventions at sea carried out by the Libyan partners gradually became irreconcilable with the rescues carried out by non-governmental units. This is explained by the fact that the Italian authorities, well supported by European institutions,²³ first discouraged and then hindered the NGOs' SAR activities. From being a factor in attracting migrants, the latter actually became the subject of a series of investiga-

20. United Nations Office for the Coordination of Humanitarian Affairs (OCHA). (2020). Libya Situation Report. United Nations, *High Commissioner for Refugees* (UNHCR). (2018). UNHCR Position on Returns to Libya - Update II, September 2018. And International Organisation for Migration (IOM), Missing Migrants, tracking deaths along migratory routes.

21. Numerous NGOs and international organisations have officially declared that Libya cannot be considered a safe country. Most recently, see Amnesty International, *Between the Devil and the Deep Blue Sea. Europe Fails Refugees and Migrants in the Central Mediterranean*, 2018, 17 ff., www.amnesty.org; UNHCR, IOM, Joint Statement: International Approach to Refugees and Migrants in Libya Must Change, 11 July 2019, www.unhcr.org. The courts have also made declarations to this effect as well. Thus, for example, with regard to the case-law at the national level, see the order rejecting the request for preventive seizure of 16 April 2018 of the Court of Ragusa, Office for Preliminary Investigations, confirmed by the Court of Review of Ragusa on 11 May 2018 in the Open Arms case; see Francesca De Vittor, 'Soccorso in mare e favoreggiamento dell'immigrazione irregolare' (2018) *Diritti Umani e Diritto Internazionale*, Vol 12, 443-452.

22. Memorandum of understanding on cooperation in the fields of development, the fight against illegal immigration, human trafficking and fuel smuggling and on reinforcing the security of borders between the State of Libya and the Republic of Italy, Rome, 2 February 2017.

23. Frontex, Annual Report, cit.

tions and judicial enquiries. The effect produced by these investigations and the related criminal and administrative proceedings²⁴ was to prevent the carrying out of SAR activities, causing a major reduction in the number of private units operating in the area.

Thirdly, at the same time as judicial action, in terms of domestic legislation, the government took various measures that restricted the humanitarian initiatives of NGOs in both international and Italian territorial waters. We recall the most significant ones. First of all, on 7 August 2017, the Italian Minister of the Interior, again with the unanimous support of his European counterparts, adopted an ambiguous document, the so-called Minniti Code, containing a series of equally ambiguous rules of conduct which aimed to circumscribe the rescues of non-governmental units and favour Libyan interventions.²⁵ The rules of conduct, while non-binding on paper, were followed in 2018 and 2019 by two well-known security decrees²⁶ and various implementing ministerial

24. For an overview of proceedings against private actors involved in SAR activities in the Mediterranean, see Fundamental Rights Agency, '2019 update - NGO Ships involved in Search and rescue in the Mediterranean and Criminal investigations', 2019, <https://fra.europa.eu>.

25. Italian Ministry of the Interior, Code of Conduct for NGOs engaged in rescue operations of migrants at sea, 2017 (*Codice di condotta per le ONG impegnate nelle operazioni di salvataggio dei migranti in mare*), available on the Ministry's official website: https://www.interno.gov.it/sites/default/files/codice_condotta_ong.pdf. Regarding the support of European institutions, it should be recalled that at the informal meeting of Justice and Home Affairs Ministers held on 6 July in Tallinn, under the Estonian Presidency, the EU Home Affairs Ministers welcomed the Code of Conduct. The Italian initiative was also included in the 'Action Plan on measures to support Italy, reduce pressure along the Central Mediterranean route and increase solidarity', presented by the European Commission on 4 July 2017.

26. Decree-Law No. 113/2018, in conjunction with Conversion Law No. 132/2018, in the Official Journal of 3 December 2018, No. 281; Decree-Law No. 53/2019, in the Official Journal of 14 June 2019, No. 138; the rules of which were amended by Decree-Law No. 130/2020, in the Official Journal of 21 October 2020, No. 130.

decrees²⁷ through which the Italian government laid down further conditions for the innocent passage of foreign-flagged non-governmental vessels in Italian territorial waters as well.

Some five years after the start of this third phase, the security-based approach that guides the trend towards a reduction of responsibility for immigration flows does not seem forward-looking. UN data show a kind of *regularisation* of *irregular* flows along the central Mediterranean route. Most of the irregular crossings to the EU take place in this area.²⁸ Not even the Covid-19 pandemic has deterred migrants from setting sail from the North African coast. Thus, Frontex detected more than 35,600 irregular crossings in 2020, compared to a figure of 14,000 in 2019. And in the first four months of 2022 alone, over 18,000 crossings were counted.²⁹

2.4 Consolidating the process of reducing responsibility and moving towards remote surveillance

The Italian authorities' gradual reduction of responsibility for the management of irregular migration by sea should also be examined in light of the broader European institutional context regarding the control of the external maritime border of the European Union, which has identified integrated border management as one of its priorities. Thus, the

27. For example, a measure issued by the Minister of the Interior, in agreement with the Minister of Defence and the Minister of Infrastructure and Transport, dated 1 August 2019, notified by e-mail, ordering 'as of now' the prohibition of entry, transit and stopover of the ship OPEN ARMS 'in national territorial seas.' This measure was also adopted in accordance with the aforementioned Security Decree bis; see footnote 4 above.

28. UNODC, Observatory on Smuggling of Migrants, West Africa, North Africa and the Central Mediterranean - Key Findings on the Characteristics of Migrant Smuggling in West Africa, North Africa and the Central Mediterranean, 20 May 2021, available at <https://www.unodc.org/res/som/docs/Observatory_Storymap_1_Final_2021.05.19.pdf>.

29. FRONTEX, Migratory Map, Detections of illegal border-crossings statistics.

European Border and Coast Guard was established by EU Regulation 2019/1896, which came into force in Italy on 4 December of the same year. This Regulation highlighted the ever-increasing need to effectively monitor the crossing of external borders in order to ensure a higher level of internal security within the EU. Such monitoring involved implementing a series of systems to control migration flows, in particular as regards coordinating the activities of the various agencies operating in this area, such as the European Police Office (EUROPOL), the European Maritime Safety Agency (EMSA) and the European Border Surveillance System (EUROSUR). Of particular importance is the latter, which is managed by Frontex, using big data technologies, including satellite images and vessel registration services. Its specific aim was to monitor cross-border traffic. This system represented an important shift from the simplest control systems at sea to radar and satellite surveillance solutions at the European level focused on principles of standardisation and automation of the exchange of information between networks and SAR systems. It was therefore the technological element that enabled the implementation of a surveillance integration framework known as common pre-frontier intelligence, which allowed images collected by EMSA's drones to be immediately evaluated by the coastguards of States with territorial responsibility and simultaneously sent to the European Agency for the Management of Operational Cooperation at the External Borders of EU Member States, which is part of the EUROSUR system. These surveillance technologies aimed to improve 'situational awareness' at sea, in other words, the ability to monitor, detect, identify, locate, and understand irregular cross-border activities in order to find grounds for response measures. This is achieved by combining new information with already acquired knowledge and being more effective in reducing security threats at, along or near the external borders.

National management of migration flows thus became strategically integrated at the European level, with national border control planning

coordinated with the development plans of other Member States. In other words, Member States retained immediate responsibility for managing their own borders, while the Agency would coordinate their actions. The Agency's activities would therefore complement the efforts of Member States.

The second – more operational – level of integration consisted of a timely exchange of information and data that was as comprehensive as possible between Italy, the other Member States, and the EU. This revolved around the EUROSUR system, considered to be the real hub of integrated management.

3. The compatibility of domestic implementation measures with international maritime law

A description of the measures taken by Italy over the last ten years to manage irregular migration in the Mediterranean Sea shows, first of all, a progressive geographical retreat of the scope of such measures laid down by the various authorities involved from the high seas to Italy's territorial waters. While in the first phase, the aeronaval assets coordinated by the Navy and the police forces coordinated by the DNA went as far as the high seas for both SAR initiatives and policing. In the second phase, *Mare Nostrum* ended and Italian military units took part in various joint operations, coordinated at a European level. These joint operations gradually reduced their working mandate and were downsized even further in the third and final phase examined, in which the Government limited/prohibited the access of rescuers, both public and private, even in its own territorial waters. It is clear that this practice has implications in international maritime law. It could be argued that as Italy's commitment to managing migratory flows weakens, a greater number of provisions are violated.

Thus, when, in October 2013, the Italian authorities responded to the humanitarian emergency by setting up the *Mare Nostrum* operation, they fully implemented the rescue obligations under the aforementioned Montego Bay Convention.³⁰ Indeed, as is well known, under Article 98(1) of that Convention, Italy, as a flag State, must require masters of ships flying its flag to render assistance to anyone at sea in distress.³¹ Furthermore, under the next paragraph of the same article, Italy, this time as a coastal State, must promote the establishment and operation of an SAR service to protect maritime safety.³² However, while it is undisputed that rescue actions can and should be provided in any area of the sea, the use of police powers in extraterritorial waters is rather the result of repeatedly having recourse to an interpretation of the law. This can be seen first of all from the above-mentioned directive in which the DNA, in coordinating different police forces, explained that in order to take action against suspected traffickers, a causal link must be presumed between the crime, partially or totally perpetrated on the high seas, and the territory of the Italian State.³³ On this point, it is worth noting that, according to the DNA, such a link exists when the alleged traffickers have intentionally used the rescue procedures to activate the intervention of the Italian authorities. This is because when migrants reach the coast and enter Italian territory, the condition of “procuring illegal entry, the consummation of which did not stop in international waters, but, through the resources used in rescue activities, also took place in the territory of the State” can be considered to have been fulfilled.³⁴ The idea of resorting to this inter-

30. Montego Bay Convention, cit. Other aspects of the relief obligation are regulated by the SOLAS Convention, cit. and the SAR Convention, cit.

31. Ibid., Art. 98(1).

32. Ibid., Art. 98(2).

33. DNA, Guidelines, cit.

34. Ibid., 31, para h-8.

pretation has subsequently been endorsed by the Italian courts, at first instance, on appeal, and by the Court of Cassation, which have used it to establish their criminal jurisdiction over the alleged traffickers. As a result, the case law of the courts has established that the conduct carried out in extraterritorial waters is linked to that which takes place in territorial waters, where the action of the rescuers is carried out. The rescuers are obliged to intervene because of the obligations entered into at the international level to avert a more serious evil.³⁵

This approach has its own overall coherence that is confirmed by both Italian and international law. With regard to the former, it is sufficient to recall that the Italian courts have also recently affirmed their jurisdiction with respect to other transnational criminal offences that appeared to end in international waters but which, in reality, had a connection with Italian territory.³⁶ With regard to international maritime law, since the first half of the last century, there has been a general tendency for coastal states to assert their claims in the waters adjacent to their shores. Initially, the pretext used for this was precisely to identify a causal link between an apparently exclusively maritime matter, such as illegal fishing, and the territory of the coastal state. In the decades that followed, this practice of

35. Italian Supreme Court (Criminal Division), Sec. I, judgment of 23 January 2015. See in this regard, Irini Papanicolopulu, 'Immigrazione irregolare via mare ed esercizio della giurisdizione: il contesto normativo internazionale e la recente prassi italiana', 1-22, in Irini Papanicolopulu (et al.), *L'immigrazione irregolare via mare nella giurisprudenza italiana e nell'esperienza europea* (Giappichelli, 2016).

36. Finally, the Italian Supreme Court confirmed its jurisdiction over a case of international drug trafficking, in which the alleged traffickers were apprehended in international waters yet continued their criminal action in Italian territorial waters. See the judgment of the Italian Supreme Court (Sec. IV Criminal) of 20 February 2019, no. 269; Italian Supreme Court (Sec. III Criminal), judgment of 21 June 2019, no. 27691. On the subject, Marco Ferruglio, 'Libertà di navigazione e contrasto al traffico internazionale di stupefacenti: una recente pronuncia della Corte di Cassazione sui limiti all'esercizio della giurisdizione in alto mare su navi battenti bandiera straniera', *Il Diritto Marittimo*, 2020, p. 126 ss.; Marina Castellaneta, 'La Cassazione sulla giurisdizione italiana per illeciti a bordo di una nave straniera', 28 June 2019.

coastal States became consolidated and unequivocally extended to other criminal areas. The logic behind this process remains that of protecting the interests and security of the coastal State with respect to offences that apparently only take place on the high seas. The same logic, moreover, also guides the rule on territorial sovereignty. As is well known, this is the oldest rule of customary international law on the delimitation of the governing power of any state. Various and well-known theories justify the exercise of territorial sovereignty. However, they all revolve around how to conceive the relationship between the exercise of sovereign powers and the related territorial community.

With the transition to the second phase, the maritime scenario began to change, and consequently, the compatibility of Italian practice with international maritime law began to diminish. The termination of *Mare Nostrum* created a gap - which has yet to be filled - regarding the obligation under Article 98(2) of the Montego Bay Convention. This is despite the fact that this provision requires Italy - and every coastal State who is a party to the Convention - to establish a SAR service that is *adequate* and *effective*, while also functioning on a *permanent basis*. At this intermediate stage, however, Italian air-sea units are engaged in occasional rescue and in military and police activities within the framework of joint operations coordinated at the European level. This commitment could ensure the implementation of the rescue obligation under Article 98(1)³⁷ and the cooperation obligations under the Palermo Protocol,³⁸ which, as mentioned in the introduction of this article, aims to prevent and stop the transnational smuggling of migrants and, at the same time, safeguard its victims.

37. Montego Bay Convention, cit., Art. 98(1).

38. Protocol against the Smuggling of Migrants by Land, Sea and Air, supplementing the United Nations Convention against Transnational Organised Crime, done at New York on 15 November 2000.

In the third phase, the first provision and subsequent renewals of the Memorandum of Understanding with the Libyan government, along with the adoption of the package of restrictive measures regarding the entry into and transit through Italian territorial waters, consolidated the process of retreat and the simultaneous initiation of a new approach, namely the concealment of the actors involved in the management of sea migration flows. Particular attention should be paid here to the blurring of the legal difference between rescuers and migrant smugglers that took place. In fact, during this stage, members of NGOs who intervened to fill the institutional void left due to both Italy ending *Mare Nostrum* and the EU not replicating a similar operation were charged with the crime of aiding and abetting illegal immigration or other related offences. Such a practice is difficult to reconcile with the approach taken by the Italian courts described above, according to which rescuers must intervene to avert a state of necessity that is desired, caused, and foreseen by other subjects, namely the traffickers. Moreover, Italian judges have remained faithful to this approach and, even more recently, they have excluded the criminal liability of NGO members by applying the principle of the state of necessity, the fulfilment of the duty to rescue, and other exemptions. With respect to the compatibility of this process of concealment, it is worth mentioning the judgement of the Canadian Supreme Court in *Ocean Lady*.³⁹ In this case, the Canadian Supreme Court excluded the liability of rescuers for aiding and abetting illegal immigration by directly referring to the essence of the Palermo Protocol.⁴⁰ The national immigration laws of Canada and the other Contracting Parties to the Protocol should give full effect to this judgment. According to the approach taken by the Supreme Court,

39. Supreme Court of Canada, *R. v. Appulonappa*, judgment No. 35958 of 27 November 2015. In the same vein, see the almost contemporaneous decision of the same court, *I Supreme Court of Canada, B010 v. Canada (Citizenship and Immigration)*, judgment of 27 November 2015, nos. 35388, 35677, 35685, 35688.

40. Palermo Protocol (n 38).

which we fully support, it is clear from the main provisions of the Palermo Protocol⁴¹ that a clear dividing line must be drawn between traffickers and rescuers. While the former act for profit, the latter act out of solidarity. This interpretation is confirmed in the *travaux préparatoires* of the Protocol, where it is expressly stated that the profit motive is an essential element of the offence defined in the provisions of the Protocol, in the absence of which the offence of migrant trafficking cannot be said to exist.⁴²

As for the fourth and final phase, the analysis of the measures taken over the last decade was related to the imminent challenges posed by the advent of new technologies. In particular, in the area of maritime security, it was observed how the air-sea patrolling initiatives of the Mediterranean Sea have been successively complemented by a series of surveillance initiatives, only possible thanks to the use of advanced technologies, such as satellites, radar, and drones. Like air-sea patrolling, remote surveillance is also intended to strengthen the security of the EU's maritime borders. However, innovation also has a dark side. The new surveillance methods, in fact, can be easily reconciled with both the process of retreat, which started in the second phase, and the blurring of roles between actors involved. The implications of this are essentially ethical in nature. The fear is that the use of new technologies in the management of migration flows by sea could mean an incontrovertible form of reduction of responsibility of the state authorities called upon to intervene. Finally, on a strictly legal level, the increasing use of this kind of technology entails further risks concerning the compatibility of maritime surveillance resources

41. Ibid., esp. in Art. 6.

42. Report of the Ad Hoc Committee on the Elaboration of a Convention against Transnational Organised Crime on the work of its first to eleventh sessions, including the Addendum on Interpretative notes for the official records (*travaux préparatoires*) of the negotiation of the United Nations Convention against Transnational Organised Crime and the Protocols thereto, UN Doc. A/55/383/Add. 1, 3 November 2000, esp. at paras. 88 and 91. See also, more recently, UNODC, Issue Paper: The Concept of "Financial or Other Material Benefit" in the Smuggling of Migrants Protocol, Vienna, 2017.

with international human rights mechanisms. Such risks essentially concern the right to privacy of migrants themselves, who are particularly exposed to new forms of control concerning their personal data, which can be captured through the aforementioned surveillance tools, but also, at an everyday level, through the web, social networks, applications, and other digital technologies that shorten the distances between countries in exchange for precious personal information.

4. Conclusion

The starting point of this analysis is the recognition that Italy has been involved in the management of migratory flows in the Mediterranean Sea since the time of Aeneas. It is then seen how, over the period of time examined, Italy has always been engaged in both humanitarian and law enforcement activities. However, what has changed profoundly over the last decade is both the ways in which this commitment has been put into practice and those with whom, in the different phases, the Italian authorities have cooperated.

With regard to how Italy's involvement in managing such flows has evolved, this article describes a significant process of retreat by the Italian authorities from the high seas to its territorial waters. The umpteenth massacre, that of Crotone, led to a further retreat - one might say to the mainland - since the Italian patrol boats did not set sail, despite the fact that the event in question, which was reported, took place only a few metres away from the Calabrian coast.⁴³ This process of retreat, to

43. Alessia Candito, *Crotone, strage di migranti: 23 ore prima del naufragio partito l'allarme per una barca in difficoltà* (*La repubblica*, 1 March 2023), available at <https://www.repubblica.it/cronaca/2023/03/01/news/naufregio_crotone_allarme_23_ore_prima_migranti_calabria-390118802/>.

which technological progress has clearly contributed, is at odds with both domestic and international practice on cooperation in countering organised maritime crime and on rescuing and safeguarding the rights of victims of such offences. With regard to those involved, certain governing bodies of Italy have, for various reasons, repeatedly sought and, over time, obtained the support of various entities, both public and private, most recently European institutions.

Without wishing to ignore the difficulties involved in managing migratory phenomena, especially during the most acute moments, the approach taken at both the Italian and European levels can only be described as astonishing. A feeling of fear prevails, expressed through a lack of solidarity. Nonetheless, we would like to conclude with a wish, one that prompted us to contribute to this volume, namely the hope that the exchange of views among scholars and professionals who are strongly engaged in international law of the sea may help to bridge the existing gap of responsibility and lead us back to the indelible traces of Aeneas' civilisations.

Fishing activities conducted with the use of forced labour under the revised EU fisheries control system: Improving maritime security through control, inspection, and technology

■ Pierandrea Leucci*

1. Introduction

There was once a Peugeot 406 parked on Boulevard Louis Schmidt, Brussels, with a large sticker on the hood that said: ‘fishing is more than fish’, and a picture of two anglers in the background smiling and holding beers. No, this is not a paper about the importance of recreation in fostering friendship and social interaction. Yet, one aspect of that story is also relevant here. Fishing is not just about fish. It is first and foremost about *humans*, alone and in their interaction with nature.¹ It is about

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1. Chin-Chia Thien, ‘Reflections on the Human-Fish Nexus in the Law of the Sea: Innovations in Legal Doctrine for Sustainable Fisheries’, 160-1, in Pierandrea Leucci and Ilaria Vianello (eds.), *ASCOMARE Yearbook on the Law of the Sea. Volume 2: Fisheries and the Law of the Sea in the Anthropocene Era* (Luglio Editore, 2022).

fishers, consumers, buyers, retailers, the people working for and in fisheries, whether on land or at sea, and those depending on fish for their livelihoods and subsistence (over 3.3 billion people in the world).²

As early as 1609, Grotius held in his *Mare Liberum* that certain fishing obligations bind “not the thing, that is the sea or fishing, but the persons”.³ Fishing is a human activity, with all the legal considerations and socio-economic implications involved in managing fish in a long-term and sustainable manner.

Fashioning the discussion around humans does not diminish the importance of everything else, including fish. On the contrary, by examining fishing-related aspects from a human perspective, we can truly appreciate the significance of preserving the relationship between humans and nature. The equation is easy: a decline in the fish population can have dire consequences for business, the job market, food supply, and biodiversity at large, with operational and human externality costs likely to impact the security of individuals and States in the short to long term,⁴ such as those resulting from fishing operations carried out using forced labour. A hideous practice consisting of exacting fishing work or services from someone under the threat of punishment, and closely linked to the unsustainable use of marine living resources, illegal, unreported, and unregulated (IUU) fishing, and transnational organized crime, including human trafficking at sea.⁵

2. Daniel F. Viana (et al), ‘Nutrient Supply from Marine Small-scale Fisheries’ (2023) Scientific Reports, Nature Portfolio, (2023)13:11357, 1-9, 1; and Food and Agriculture Organization, ‘The State of World Fisheries and Aquaculture (SOFIA) 2022’ (Rome, 2022) 87.

3. Hugo Grotius, *The Free Sea* (Knud Haakonssen trad., Liberty Fund Ind., 2004) 31.

4. Alejandro J. Garcia Lozano (et al.), ‘Decent work in fisheries: Current trends and key considerations for future research and policy’ (2022) Marine Policy 136 (2022) 104922, 1-10, 2; and Kjellrun Hiis Hauge (et al.), ‘Fisheries Depletion and Collapse’, 2-5, in *IRGC Report “Risk Governance Deficits: An Analysis and Illustration of the Most Common Deficits in Risk Governance”* (Geneva, 2010).

5. European Union, *Consolidated version of the Treaty on European Union*, 13 December 2007, 2008/C 115/01.

States and regional actors may have a specific policy interest in addressing the socio-economic implications of fisheries and the fight against forced labour in the seafood industry. When it comes to the European Union (EU), such a policy interest operates at multiple levels, including at: (a) the consumer level, to ensure that products stemming from forced labour do not reach the EU market; (b) the fishery production level, to ensure the long-term conservation of fish stock and protect the interests of people, including honest fishing operators and coastal communities, depending on it; and (c) the human level, to preserve the EU founding values of respect for human dignity and human rights, as reflected in the relevant provisions of the Treaty on European Union (TEU) and in the Charter of Fundamental Rights of the EU.⁶

The EU has equipped itself with a regulatory toolbox that covers various areas of work and competences of the Union, such as social policy, judicial cooperation in criminal matters, trade, consumer protection, and fisheries. The legislation on fisheries is particularly important for the EU, as fishing activities involving forced labour often occur in maritime areas where coastal States have powers to prescribe and enforce fishery regulations, as outlined in the 1982 UN Convention on the Law of the Sea (UNCLOS)⁷ and international customary law.⁸ These powers extend to fishing activities carried out by vessels flying the flag of other States.⁹

6. TEU, Articles 2 and 6.

7. United Nations Convention on the Law of the Sea, opened for signature 10 December 1982, 1833 UNTS 3 (entered into force 16 November 1994).

8. J. Ashley Roach, 'Today's Customary International Law of the Sea' (2014) *Ocean Development & International Law*, 45:3, 239-259, 247; and Carolyn Hudson, 'Fishery and the Economic Zones as Customary International Law' (1980) 17 *San Diego L. Rev.* 661, 661-689. See also, *South China Sea Arbitration* (The Republic of Philippines v. The People's Republic of China), Award, Merits, Permanent Court of Arbitration, 12 July 2016, 257.

9. Robin Churchill, Vaughan Lowe and Amy Sander, *The Law of the Sea (Fourth Edition)* (Manchester University Press, 2022), 545-549.

The EU regulatory framework governing fisheries is based on a differentiated system of competences, which is laid down by the Treaty for the Functioning of the European Union (TFEU).¹⁰ On the one hand, Article 3(1)(d) of the TFEU provides for the exclusive competence¹¹ of the Union on the conservation of marine biological resources under the common fisheries policy (CFP), including rules on fisheries control, inspection and enforcement that are necessary to ensure compliance with the CFP objectives. On the other hand, Article 4(2)(d) of the TFEU indicates that "... fisheries, excluding the conservation of marine biological resources" are a shared competence between the Union and the Member States.¹² While compliance with minimum labour standards onboard fishing vessels normally falls within the scope of the latter provision and other shared competences of the EU,¹³ fishing activities conducted with the use of forced labour are relevant for the CFP so long as they affect, either directly or indirectly, the conservation and management of fish stocks.

Building on the above considerations, after 5 years of intense legislative negotiations on the revision of the fisheries control system of the CFP, the European Parliament and the Council of the EU eventually agreed to amend Regulation (EC) 1224/2009 ('the Control Regu-

10. European Union, *Consolidated version of the Treaty on the Functioning of the European Union*, 13 December 2007, 2008/C 115/01.

11. Article 2(1) of the TFEU provides that "[w]hen the Treaties confer on the Union exclusive competence in a specific area, only the Union may legislate and adopt legally binding acts, the Member States being able to do so themselves only if so empowered by the Union or for the implementation of Union acts".

12. Article 2(2) of the TFEU provides that "[w]hen the Treaties confer on the Union a competence shared with the Member States in a specific area, the Union and the Member States may legislate and adopt legally binding acts in that area. The Member States shall exercise their competence to the extent that the Union has not exercised its competence. The Member States shall again exercise their competence to the extent that the Union has decided to cease exercising its competence".

13. E.g., Article 4(2)(b) and (j) of the TFEU.

lation')¹⁴ to include, among other things, new rules on fisheries control and enforcement addressing some of the challenges posed by forced labour to the conservation and management of marine living resources. These rules go hand-in-hand with other important legislative changes laid down by the revised Control Regulation on vessels tracking, sanctions and the use of technology for control purposes. The author of this paper contributed to the drafting and negotiation of some of the relevant amendments and provisions on behalf of the European Commission, especially those concerning sanctions and fishing activities conducted with the use of forced labour.

This chapter aims to explore and discuss how the new EU fishery control rules and technology can contribute to curbing forced labour in fisheries, for the benefit of maritime security at large. To do that, the chapter starts with some background information on forced labour in fisheries (section 2) and on social sustainability under the CFP rules (section 3). Then, the chapter discusses the EU fisheries control system in light of the recent legislative changes, with a focus on the provisions related to forced labour, control technology and the law of the sea (section 4). Lastly, it elucidates the complexities underlying the relationship between forced labour, fisheries control, and maritime security (section 5) before closing with some final remarks (section 6).

14. Council Regulation (EC) No 1224/2009 of 20 November 2009 establishing a Union control system for ensuring compliance with the rules of the common fisheries policy, amending Regulations (EC) No 847/96, (EC) No 2371/2002, (EC) No 811/2004, (EC) No 768/2005, (EC) No 2115/2005, (EC) No 2166/2005, (EC) No 388/2006, (EC) No 509/2007, (EC) No 676/2007, (EC) No 1098/2007, (EC) No 1300/2008, (EC) No 1342/2008 and repealing Regulations (EEC) No 2847/93, (EC) No 1627/94 and (EC) No 1966/2006.

2. Forced labour in fisheries

The Food and Agriculture Organization (FAO) reports that an estimated 38 million of people were employed in global capture fisheries in 2020,¹⁵ for a total first sale value of fishery production of USD 141 billion¹⁶ and a trade net of about USD 150 billion.¹⁷ Over 124,000 of those people are estimated to work on EU fishing vessels,¹⁸ with thousands more operating onboard foreign vessels fishing in the maritime waters of the 22 coastal Member States of the EU, which today form the largest combined exclusive economic zone (EEZ) in the world.¹⁹

Fishing is a risky business, one of the three most dangerous occupations in the world.²⁰ The main reason for this lies in the nature and operational aspects of fishing activities, which require intense physical work and the use of dangerous gear and techniques, and are carried out in an adverse environment.²¹ Tailored safety and labour rules and standards are important to ensure decent working conditions in fisheries and prevent human rights abuses and exploitative practices from taking place onboard fishing vessels. This includes abuses and practices connected with forced labour, which involves the exaction of fishing work or services from someone under the threat of punishment, in accordance with Ar-

15. SOFIA (n 2) 66-68.

16. Ibid., 1.

17. Ibid., 5.

18. Scientific, Technical and Economic Committee for Fisheries (STECF), *The 2022 Annual Economic Report on the EU Fishing Fleet (STECF 22-06)*, 30.

19. European Commission, Joint Communication to the European Parliament and the Council on the update of the EU Maritime Security Strategy and its Action Plan “An enhanced EU Maritime Security Strategy for evolving maritime threats” (JOIN(2023) 8 final).

20. SOFIA (n 2) 143; and FAO, Committee on Fisheries, Thirty-fourth Session, ‘Safety at sea and decent work in fisheries and aquaculture’, 1-5 February 2021 (COFI/2020/Inf.14.1).

21. ILO, *Caught at Sea – Forced Labour and Trafficking in Fisheries* (ILO, 2013) 19.

ticle 2 of the International Labour Organization (ILO) Convention on Forced Labour, 1930 (No 29)²² and its supplementing Protocol adopted in 2014.²³

Academia, UN agencies,²⁴ the fishing industry, and civil society²⁵ have frequently linked forced labour to:

- a. *The unsustainable use of marine living resources.* Poor fisheries management and overfishing can contribute to the depletion of stocks and the subsequent increase in fisheries production costs, fishing efforts, and market prices.²⁶ This situation may lead dishonest operators to maximise profits or leverage fisheries production expenses (e.g., crew, gear and fuel costs)²⁷ by illegally recruiting people, particularly mi-

22. ILO, *Forced Labour Convention, C29*, 28 June 1930, C29. In force, 1 May 1932.

23. ILO, *Protocol of 2014 to the Forced Labour Convention, 1930*, 11 June 2014, P029. In force, 9 November 2016.

24. E.g., UNODC reports: *Global Report on Trafficking in Persons* (UNODC, 2020); and ILO, 'Profits and Poverty: The Economics of Forced Labour' (Geneva, 2014), and ILO (n 21).

25. E.g., Human Rights Watch report: 'Hidden Chains: Human Rights Abuses and Forced Labour in Thailand's Fishing Industry' (2018); Greenpeace and SBMI reports: 'Forced Labour at Sea: The Case of Indonesian Migrant Fishers' (2021) and 'Seabound: The Journey to Modern Slavery on the High Seas' (2019); and European Justice Foundation report: 'Blood and Water: Human Rights Abuse in the Global Seafood Industry' (2019).

26. Sara G. Lewis (et al.), 'Chapter 18 - Human Rights and Sustainable Fisheries', 381-382, in Phillip S. Levin and Melissa R. Poe, *Conservation for the Anthropocene Ocean. Interdisciplinary Science in Support of Nature and People* (Elsevier Inc., 2017); Penelope J. Ridings, 'Labour Standards on Fishing Vessels: A Problem in Search of a Home?' (2021) *Melbourne Journal of International Law*, Vol. 22, 1-24, 2-3; Christina Stringer (et al.), 'Not in New Zealand's waters, surely? Labour and human rights abuses aboard foreign fishing vessels' (2011) *New Zealand Asia Institute Working Paper Series No. 11-01*, 3; and Andrea Longo, 'The Human Dimension of Fishing Activities: Towards a Broader Meaning of Illegal Fishing?', 127-8, in Pierandrea Leucci and Ilaria Vianello (eds.), *ASCOMARE Yearbook on the Law of the Sea. Volume 2: Fisheries and the Law of the Sea in the Anthropocene Era* (Luglio Editore, 2022). See also, ILO (n 21) 22.

27. Scientific, Technical and Economic Committee for Fisheries (STECF), *The 2022 Annual Economic Report on the EU Fishing Fleet (STECF 22-06)* (EU, 2022) 232.

grants,²⁸ and cutting costs related to safety and labour standards in fisheries. ILO recently observed that: “...there seems to be a direct link between overfishing, declining fish stocks and the use of forced labour on board fishing vessels in some parts of the world.”²⁹

- b. *IUU fishing activities*. Numerous studies and research have addressed IUU fishing vis-à-vis forced labour.³⁰ This link was also recognised by the European Commission in its 2020 report on the implementation of Regulation (EC) 1005/2008 (‘the IUU Regulation’),³¹ where the Commission noted that “[b]reaches of human rights and labour rights in the fisheries sector are often associated with IUU fishing.”³² Accordingly, in a resolution published by the European fishing industry in 2023, “[t]he social partners underlined growing and shared evidence that the fleets scoring worst in global illegal, unreported and unregulated (IUU) fishing are also the ones where

28. SOFIA (n 2) 143; Melissa Marschke, Peter Vandergeest, ‘Slavery scandals: Unpacking labour challenges and policy responses within the off-shore fisheries sector’ (2016) Marine Policy, Vol. 68, June 2016, 39-46, 41; Lozano (et al.) (n 4) 4; Charlotte Tindall (et al.), ‘Illuminating the Mechanisms to Mitigate Forced and Child Labour Risks Within Marine Stewardship Council Certified Fisheries’ (2022) Marine Policy 143 (105140), 1-10, 1; and Lewis (et al.) (n 26) 380.

29. ILO, *Fisher First - Good Practices to End Labour Exploitation at Sea* (ILO, 2016) 8-13.

30. Julio Jorge Urbina, ‘Towards an international legal definition of the notion of fisheries crime’ (2022) Marine Policy, Vol. 144, October 2022, 1-6, 3-4; Ridings (n 26) 2; Lozano (et al.) (n 4) 2; Alastair Couper, Hance D Smith and Bruno Ciceri, *Fishers and Plunderers: Theft, Slavery and Violence at Sea* (Pluto Press, 2015) 78-94; ILO (n 21) 11; and Mary Mackay (et al.), ‘The Intersection Between Illegal Fishing, Crimes at Sea, and Social Well-Being’ (2020) Front. Mar. Sci. 7:589000, 1-9, 6.

31. Council Regulation (EC) No 1005/2008 of 29 September 2008 establishing a Community system to prevent, deter and eliminate illegal, unreported and unregulated fishing, amending Regulations (EEC) No 2847/93, (EC) No 1936/2001 and (EC) No 601/2004 and repealing Regulations (EC) No 1093/94 and (EC) No 1447/1999.

32. Report from the Commission to the European Parliament and the Council on the application of Council Regulation (EC) No 1005/2008 establishing a community system to prevent, deter and eliminate illegal, unreported and unregulated fishing (COM(2020) 772 final).

more cases of forced labour and human rights and labour abuses are observed.”³³

- c. *Human trafficking at sea*. Exploiting individuals to compel them to work in fisheries falls within the definition of ‘Trafficking in persons’ outlined in Protocol II to the Palermo Convention on Transnational Organized Crime.³⁴ UN data reports that 28% of the 27.6 million people trafficked every year to be forced into work³⁵ eventually end up in the fishing sector, including in Europe.³⁶ These numbers have been showing a growing trend during the COVID-19 pandemic.³⁷ In 2020, UNODC noted that “it is likely that traffickers will continue to rely on the very nature of fishing and its remoteness in the world’s oceans to exploit victims, in particular migrants”.³⁸

Effectively preventing, deterring and eliminating forced labour in fisheries requires understanding its practical implications and challenges. Moreover, coordinated work and widespread ratification and implementation of the relevant international legal instruments and standards are needed, including those encapsulated in the International Labour

33. Resolution of the Social Partners in the sea-fisheries sector on the fight against forced labour (Brussels, 30 January 2023), Para 4.

34. UN General Assembly, *Protocol to Prevent, Suppress and Punish Trafficking in Persons, Especially Women and Children, Supplementing the United Nations Convention against Transnational Organized Crime*, 15 November 2000. See also, European Court of Human Rights, *Rantsev v. Cyprus and Russia*, Judgment, 7 January 2010, 282.

35. ILO, Walk Free, International Organization for Migration, *Global Estimates of Modern Slavery. Forced Labour and Forced Marriage* (Geneva, 2022) 22-26 and 33.

36. Emmet Malone, ‘Action needed to protect migrant fishers working on foreign vessels in Irish waters, says Union’ (2023) *The Irish Times*, 17 February 2023, available at <<https://www.irishtimes.com/ireland/social-affairs/2023/02/17/action-needed-to-protect-migrant-fishers-working-on-foreign-vessels-in-irish-waters-says-union/>>; Lewis (et al.) (n 26) 380; Longo (n 26) 132; and Lozano (et al.) (n 4) 3.

37. ILO (et al.) (n 35) 27-28.

38. UNODC, *Global Report on Trafficking in Persons* (UNODC, 2020), Chapter IV (‘Trafficking for Forced Labour – The Economy of Coercion’).

Organization (ILO) Work in Fishing Convention (C-188).³⁹ The Convention was adopted in 2007 and entered into force on November 16, 2017,⁴⁰ in order to fill the regulatory gap left by other international legal instruments, such as the International Convention for the Safety of Life at Sea (SOLAS)⁴¹ and the Maritime Labour Convention (MLC),⁴² which are only limitedly applicable to fishing vessels.⁴³ This is partly due to the scale and distribution of fisheries worldwide (approximately 4.1 million fishing vessels, mostly small-scale,⁴⁴ compared to 105 thousand merchant vessels, mostly large-scale),⁴⁵ which makes implementation more complex and costly in practice.

39. ILO, *Work in Fishing Convention, 2007 (No 188)*, 14 June 2007, C188. In force, 16 November 2017. See also ILO, 'The Work in Fishing Convention, 2007 (No 188): Getting on board. Issues paper for discussion at the Global Dialogue Forum for the promotion of the Work in Fishing Convention, 2007 (No 188)', 15-17 May 2013, (5.4).

40. To date, only 21 States, including 8 Member States of the EU, have ratified C-188: Angola, Antigua and Barbuda, Argentina, Bosnia and Herzegovina, Congo, Denmark, Estonia, France, Kenya, Lithuania, Morocco, Namibia, The Netherlands, Norway, Poland, Portugal, Senegal, South Africa, Spain (from 29 February 2024), Thailand and UK. As discussed above in this paper, the EU's competence on social and labour standards related to fisheries does not generally fall under the scope of Article 3(1)(d) of the TFEU. As a result, the ratification of C-188 and the transposition of its provisions into national law lies with the Member States. On 21 May 2012, the General Confederation of Agricultural Cooperatives in the European Union (COGECA), ETF and EUROPÊCHE concluded an agreement, which was then amended on 8 May 2013, setting minimum social and labour requirements for fisheries implementing C-188. The social partners asked for these requirements to be incorporated into EU law, in accordance with Article 155 of the TFEU. The agreement was eventually adopted under Council Directive (EU) 2017/159 of 19 December 2016.

41. IMO, *International Convention for the Safety of Life at Sea*, 1 November 1974, 1184 UNTS 3. In force, 25 May 1980.

42. ILO, *Maritime Labour Convention*, 23 February 2006, MLC. In force, 20 August 2013.

43. Lewis (et al.) (n 26) 385-386; Longo (n 26) 139-141; and Ridings (n 26) 5.

44. SOFIA (n 2), 59-60.

45. United Nations Conference on Trade and Development, *Handbook of Statistics* (UN Publications, 2023), 65-66.

3. The ‘social dimension’ of the CFP

There is a common misconception about the nature and scope of the CFP rules and objectives. As the CFP primarily deals with the conservation and management of marine living resources,⁴⁶ some may assume that the human and socio-economic aspects related to the use of such resources lie outside the scope of the CFP regulatory framework. Yet, this is not the case.

Rules and standards established under the mandate of the CFP, either directly or indirectly, pertain to humans.⁴⁷ From rules on stock-assessment, which are necessary to determine national quotas and fishing capacity, to fisheries control, traceability and technical measures (e.g., temporary closure of fisheries or requirements on selective gears), there are numerous socio-economic implications of the work carried out by EU policymakers, legislators, and national authorities.⁴⁸ Fishing is a human activity, and as such, it involves legal and practical considerations related to the way fisheries are conducted, the rights and interests of individuals involved in fisheries, and the impact of fishery rules on local communities, markets, and employment.⁴⁹ These considerations reveal a pattern of human vulnerability inherent in the measures adopted by the EU to regulate fisheries.

Is that enough to justify the use of the CFP mandate to establish rules on aspects of socio-economic importance related to fisheries? Not neces-

⁴⁶. CFP Basic Regulation, Article 1(1).

⁴⁷. SOFIA (n 2) 143. On sustainability and human rights in fisheries, see also Masitha Tismananda Kumala (et al.), ‘Fishermen Human Rights Protection and Sustainable Development in the Indonesian Maritime Sector’ (2023) *Lex Portus*, Vol. 9, Issue 4, 16-25, 22-24.

⁴⁸. Simon Mardle (et al.), ‘Objectives of Fisheries Management: Case Studies from the UK, France, Spain and Denmark’ (2002) *Marine Policy* 26, 415-428, 425.

⁴⁹. Kate Brooks (et al.), ‘Selecting and assessing social objectives for Australian fisheries Management (2015) *Marine Policy* 53, 111-122, 112.

sarily. There is a distinction between legal relevance and scope. Articles 3(1)(d) and 4(2)(d) of the TFEU differentiate the competences of the EU on aspects not pertaining to the conservation of marine biological resources that are therefore beyond the scope of the CFP. Yet, the latter does not close the door to the adoption of socially sound conservation and management measures. This is reflected in Regulation (EU) No 1380/2013 ('the CFP Basic Regulation') mapping out the fundamentals of the CFP scope, objectives and policy areas.⁵⁰ In particular, the Regulation requires fishing activities to be conducted in a way that is "consistent with the objectives of achieving economic, social and employment benefits".⁵¹ It also mandates the CFP to "contribute to ensuring a level-playing field for fisheries [...] products marketed in the Union" and to assess the socio-economic impact of fishing activities on stocks,⁵² in accordance with Article 61(3) of UNCLOS and Article 6(3) of the UN Fish Stocks Agreement (UNFSA).⁵³ The EU is a contracting Party to both UNCLOS and the UNFSA.⁵⁴

The European Parliament has recently emphasised the importance of integrating and enhancing labour conditions, health and safety, training, social inclusion, and a fair standard of living in the CFP to achieve so-

50. Richard Barnes (et al.), 'Introduction: External aspects of the European Union Common Fisheries Policy' (2020) *The International Journal of Marine and Coastal Law* 35, 5-17, 6.

51. CFP Basic Regulation, Article 2(1).

52. *Ibid.*, Article 2(2) and (5)(g).

53. Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNFSA), 4 August 1995. 2167 UNTS 3. In force, 11 December 2001. The definition of 'precautionary approach to fisheries management' included in Article 4 of the CFP Basic Regulation cross-refers to Article 6 of the UNFSA.

54. UNCLOS, act of formal confirmation on 1 April 1998; and UNFSA, act of formal confirmation on 19 December 2003.

cial sustainability.⁵⁵ The latter substantiates the connection between the responsible utilization of marine resources and the management of social aspects in fisheries. Measures that promote socially responsible practices are thus justified to mitigate the human risks and actual harm caused by the unsustainable exploitation of marine biological resources. These measures should align with the objectives and scope of the CFP and also address the negative impact of exploitative practices in fisheries, particularly those that contribute to unfair competition and are associated with IUU fishing. Compliance with any rules and measures set out under the CFP mandate is to be ensured through a fisheries control system, including the fight against IUU fishing.⁵⁶

4. The EU fisheries control system

The fisheries control system of the Union is the set of CFP rules that contribute to defining the range of powers and responsibilities of Member States for the control, inspection and enforcement of fisheries conducted within and outside Union waters. The centrepiece of this system is the Control Regulation, which recently underwent a substantial restructuring of its content and provisions by means of amending Regulation (EU) 2023/2842, which entered into force on 9 January 2024.⁵⁷ The new fish-

55. European Parliament resolution of 16 September 2021 on Fishers for Future: Attracting a New Generation of Workers to the Fishing Industry and Generating Employment in Coastal Communities (P9_TA(2021)0386), Recital A.

56. CFP Basic Regulation, Article 36(1).

57. Regulation (EU) 2023/2842 of the European Parliament and of the Council of 22 November 2023 amending Council Regulation (EC) No 1224/2009, and amending Council Regulations (EC) No 1967/2006 and (EC) No 1005/2008 and Regulations (EU) 2016/1139, (EU) 2017/2403 and (EU) 2019/473 of the European Parliament and of the Council as regards fisheries control.

eries control rules build on the legislative proposal published by the European Commission on 30 May 2018⁵⁸ to (1) bridge the gaps with the CFP rules and EU policies put forward after the adoption of the Control Regulation, in 2009; (2) simplify and digitalise the fisheries control system in place; (3) improve the availability, reliability and completeness of fishery data; and (4) remove obstacles that hinder the development of a culture of compliance and equitable treatment of operators in the EU.⁵⁹

Some of the revised rules that are relevant for the discussion include the obligation for all fishing vessels to use a Vessel Monitoring System (VMS) or other tracking devices, the mandatory installation of remote electronic monitoring (REM) systems, including Closed-circuit Television (CCTV) cameras, for control purposes, and provisions to strengthen and harmonise sanctioning and enforcement for infringements of the CFP, including certain forms of forced labour in fisheries. These rules will be examined and discussed below.

4.1 Fishing activities conducted with the use of forced labour

Articles 74(8) and 90(2)(p) of the revised Control Regulation introduce rules against fishing activities conducted with the use of forced labour. These provisions were not part of the package of amendments included in the original 2018 proposal. They were set forth by the co-legislators, under the initiative of the European Commission, during the final stages of the 5-year negotiations, among other things, to better achieve the so-

58. Proposal for a Regulation of the European Parliament and of the Council amending Council Regulation (EC) No 1224/2009, and amending Council Regulations (EC) No 768/2005, (EC) No 1967/2006, (EC) No 1005/2008, and Regulation (EU) No 2016/1139 of the European Parliament and of the Council as regards fisheries control (COM/2018/368 final).

59. *Id.*

cial fisheries management objectives of the EU through fisheries control and enforcement.

Before examining and discussing the relevant CFP provisions in more detail, some clarification on the meaning and scope of ‘fishing activities conducted with the use of forced labour’ is herein necessary.

First, the term ‘forced labour’ is to be interpreted in line with the definition of ‘forced or compulsory labour’ in Article 2 of the ILO Convention on Forced Labour, 1930 (No 29) – i.e., “all work or service which is exacted from any person under the menace of any penalty and for which the said person has not offered himself voluntarily”. This is well reflected in Articles 74(8) and 90(2)(p) of the revised Control Regulation and corresponding recitals.⁶⁰ The ILO definition recognises three fundamental elements that must coexist in order to configure a situation of forced labour:⁶¹ the exaction of work or service from a person;⁶² the threat of any punishment (e.g., physical or psychological violence)⁶³ to compel a person to work or provide the service; and the involuntary nature of the condition. According to the ILO, the involuntary nature of the condition includes situations where a person offered themselves voluntarily

60. No reference is expressly made to the 2014 ILO Forced Labour Protocol extending the definition of forced labour to specific categories of people (e.g., those trafficked to be forced into work). Nonetheless, it is reasonable to believe that, also for the customary status of the relevant provisions of the Protocol, as long as those people forcibly perform or contribute to “fishing activities” onboard a fishing vessel under the (coastal or flag) Member State jurisdiction, then Articles 74(8) and 90(2)(p) and interrelated provisions of the revised Control Regulation would apply.

61. For a more detailed examination of the content of the definition of ‘forced labour’, see ILO, ‘Guidelines concerning the measurement of forced labour’ (2018) 20th International Conference of Labour Statisticians, Geneva, 10-19 October 2018 (ICLS/20/2018/Guidelines), 2.

62. “It comprises any activity performed by persons of any sex and age to produce goods or to provide services for use by others or for own use.” *Id.*

63. An example of penalty “threat” for irregular migrant workers is the menace of reporting them to the police or immigration authorities.

but was recruited under false promises and/or prevented from leaving the job.⁶⁴

Second, the term ‘fishing activity’ should be interpreted in light of Article 4(1) of the Control Regulation, which encompasses a wide range of activities related to fisheries, not just the act of catching and retaining fish onboard. The list of such activities should include, at the very least, “searching for fish, shooting, setting, towing, hauling of a fishing gear, taking catch on board, transshipping, retaining on board, processing on board, transferring, caging, fattening and landing of fish and fisheries products.”

Third, in order to commit an offence under Article 90(2)(p), a person in a condition of forced labour should contribute to or otherwise support (“conducted with the use of”) one or more of the fishing activities listed in Article 4(1) above. It is important to draw a line between actions and responsibilities of Member States for the crime of *forced labour* under EU and international law, and those concerning ‘fishing activities with the use of forced labour’ pursuant to Articles 74(8) and 90(2)(p) of the Control Regulation. The latter are narrower in scope, as they do not aim at tackling forced labour per se. Rather, they equip Member States and national authorities with the tools and powers they need to effectively detect and punish the use of forced labour in fisheries. As such, proceedings initiated by Member States under the Control Regulation are without prejudice to other proceedings that Member States may be required to initiate against natural or legal persons responsible for compulsory labour or other interrelated crimes.⁶⁵

64. ILO, ‘Guidelines concerning the measurement of forced labour’ (n 61) 2. See also Marschke and Vandergeest (n 28) 41.

65. Recital (89) of the revised Control Regulation is clear in that respect: “...conducting fishing activities with the use of forced labour should be regarded as a serious infringement, without prejudice to any criminal sanctions for forced labour in accordance with Member States’ obligations under the ILO Convention No 29 on Forced Labour.”

Fourth, the new provisions concerning fishing activities with the use of forced labour will apply from 9 January 2026, i.e. 2 years after the entry into force of Regulation (EU) 2023/2842.⁶⁶ Member States should act sufficiently in advance to give full effect to the new rules, including by training fisheries inspectors or adopting the relevant domestic legislation.

Lastly, it should be noted that forced labour in fisheries does not constitute IUU fishing for the purposes of the relevant EU legislation. The amendments brought by the fisheries control revision to Article 3 ('Fishing vessels engaged in IUU Fishing') of IUU Regulation⁶⁷ formally exclude fishing activities conducted with the use of forced labour from the scope of the latter provision.⁶⁸ Yet, it might be argued that the offence covered by Article 90(2)(p) constitutes 'illegal fishing' for the purposes of Article 2(2) of the IUU Regulation, as the former would in any case qualify as a breach of the applicable EU/national fishery law in force.⁶⁹ This is without prejudice to any different legal interpretation or practical application of the rule by the Union and its Member States.

4.1.1 Article 74(8) – Conduct of inspections

The conduct of inspections on board fishing vessels, whether in EU waters or onboard Union fishing vessels operating on the high seas, is regulated by Title VII of the Control Regulation. One of the basic rules of in-

66. Amending Regulation (EU) 2023/2842, Article 7(2).

67. Council Regulation (EC) No 1005/2008 of 29 September 2008 establishing a Community system to prevent, deter and eliminate illegal, unreported and unregulated fishing, amending Regulations (EEC) No 2847/93, (EC) No 1936/2001 and (EC) No 601/2004 and repealing Regulations (EC) No 1093/94 and (EC) No 1447/1999.

68. Article 90(2)(p) of the Control Regulation is not mentioned in the list of serious infringements qualifying as an IUU fishing conduct by fishing vessels.

69. On a broader and human rights inclusive conceptualisation of IUU/illegal fishing, see Longo (n 26) 148-153.

spection⁷⁰ is the duty of national control authorities to verify compliance of activities carried out by masters and fishing operators with the rules of the CFP.⁷¹ This obligation entails a number of tasks to be performed by fisheries officials at sea, including conducting checks onboard fishing vessels,⁷² drawing inspection reports and taking actions in the event of a suspected or confirmed infringement detected in the course of or after an inspection.⁷³ In the latter case, fisheries officials should ‘immediately’ inform other national authorities (if any) that might be competent for the violation⁷⁴ and do whatever is necessary to ensure the safekeeping of the evidence of the infringement,⁷⁵ including, where appropriate, stopping the vessel and waiting for any other competent authority to conduct further investigation, and take the necessary action required under national and Union law (see 4.1.2). Accordingly, the new Article 74(8)⁷⁶ of the Control Regulation requires fisheries officials to notify any relevant competent authorities of the Member State concerned whenever they suspect that fishing activities are conducted with the use of forced labour. For that purpose, fisheries officials should be able to conduct a preliminary assessment of the situation on the basis of indicators of potential

70. Under Article 4(4) of the Control Regulation ‘inspection means any check which is carried out by officials regarding compliance with the rules of the common fisheries policy and which is noted in an inspection report.’ The term ‘official’ is defined at point (6) of the same provision as any person authorised by a national authority, the Commission or the European Fisheries Control Authority to carry out an inspection. The latter term, as such, does not include officials of third countries engaging in inspection.

71. Control Regulation, Article 74(3).

72. *Id.*

73. *Ibid.*, Article 82(1).

74. *Ibid.*, Article 82(2)(c).

75. *Ibid.*, Article 82(2)(b).

76. Control Regulation, Article 74(8): ‘If an official carrying out an inspection has reason to believe that a fishing vessel is engaged in fishing activities with the use of forced labour, as defined in Article 2 of the International Labour Organization (ILO) Convention No 29 on Forced Labour, that official shall notify any other relevant authorities of that Member State.’

non-compliance with the relevant CFP rules. Specialised training and capacity development, in accordance with Article 74(5) of the revised Control Regulation,⁷⁷ are critical in that respect, particularly “to ensure that labour issues are understood by enforcement personnel” dealing with fisheries.⁷⁸

The above indicators could be developed under national law, building on States-practice, as well as on the list of ILO general indicators of forced labour⁷⁹ and relevant guidelines.⁸⁰ They could be taken into account for the selection of targets for inspection under the risk analysis to be performed by Member States pursuant to Article 74(10). National procedures should be in place to ensure interoperability and coordination among fisheries officials and other competent authorities. This goes along with the general obligation under Article 5(3) of the Control Regulation requiring Member States “to adopt appropriate measures, allocate adequate financial, human and technical resources and set up all administrative and technical structures necessary for ensuring control, inspection and enforcement of activities” conducted within the scope of the CFP.

4.1.2 Article 90(2)(p) – Serious infringements of the CFP

The sanctioning and enforcement regime for violations of the CFP rules is primarily laid down by Titles VII and VIII of the Control Regulation,

77. The new Article 74(5) of the Control Regulation requires Member States to provide their officials with “the training necessary to perform their tasks.” Similar training could also be financed by Member States with the EMFAF money, in accordance with the specific objectives laid down by Article 14(1) of the EMFAF Regulation.

78. ILO (n 29) 57.

79. ILO, Special Action Program to Combat Forced Labour, *ILO Indicators of Forced Labour* (1 October 2012).

80. ILO (n 61). See also ILO, *Towards Freedom at Sea. Handbook for the detection of forced labour in commercial fishing* (ILO, 2023), 8-11.

and by several provisions of the IUU Regulation. Read together, the two Regulations provide for a list of infringements of the CFP to be qualified as ‘serious’ in reason of their gravity, nature and impact.⁸¹ The list is partly inspired by the one of ‘serious violations’ established under Article 21(11) of the UNFSA.⁸²

From 9 January 2026, the new control rules will centralise (under Article 90 of the Control Regulation) and expand the list of serious infringements of the CFP. The same rules will also provide for the objective qualification of illegal conducts listed in Article 90(2) as ‘serious’, without a case-by-case assessment of their gravity, nature and impact.

The list of objectively qualified serious infringements includes the act of engaging in ‘fishing activities conducted with the use of forced labour’ (Article 90(2)(p)). This is a novelty brought by the fisheries control revision, as no serious infringement previously listed in the relevant provisions of the Control Regulation and the IUU Regulation included any similar offence.

Whenever a serious infringement under Article 90(2)(p) is detected in the waters of a Member State (e.g., in the course of or after an inspection), the competent authorities of that Member State are required to systematically take the necessary actions to ensure compliance with the CFP rules.⁸³ Such actions range from the conduct of further investigation⁸⁴ to the use of immediate enforcement measures⁸⁵ and the imposi-

81. Control Regulation, Article 90(1); and IUU Regulation, Articles 3(1) and 42(1).

82. Some of the relevant offences listed in Article 3(1) of the IUU Regulation reproduce the serious violations established under Article 21(11) of the UNFSA, provided the broader scope of application of the former provision extending beyond offences concerning highly migratory fish stocks and straddling fish stocks on the high seas and in the EEZ of a coastal State.

83. Control Regulation, Article 89(1).

84. IUU Regulation, Article 43(1).

85. *Id.*

tion of sanctions and penalty points to the master of the fishing vessel or its licence holder.⁸⁶

How does the system work in practice? If an official of a Member State suspects that a fishing activity has been conducted with the use of forced labour in the waters of that Member State or onboard fishing vessels flying its flag, after informing other national authorities (if any) competent for that offence, such official/authority is required to take the necessary immediate enforcement action to prevent the continuation of the offence and allow for its full investigation.⁸⁷ This includes, in particular, the possibility to temporarily immobilise the vessel suspected of the offence and reroute it to port to conduct further investigation.⁸⁸ In the event that the competent authorities of the Member State concerned confirm that fishing activities have been conducted with the use of forced labour, they shall ensure, among other things, that (i) the natural or legal persons responsible for the offence are punished with proportionate, effective and dissuasive sanctions, including, where applicable, with minimum administrative sanctions in accordance with Article 91a of the revised Control Regulation, and other accompanying sanctions;⁸⁹ and (ii) penalty points are assigned to the master and licence holder of the fishing vessel responsible for such offence.⁹⁰ The accumulation of points for serious infringements can lead to the temporary or permanent suspension of the fishing licence and/or the right to command a vessel,⁹¹

86. Control Regulation, Articles 90 and 92.

87. IUU Regulation, Article 43(2) [until 9 January 2026. After that, Article 91(2) of the revised Control Regulation].

88. *Id.*

89. Control Regulation, Articles 89, 89a and 91b.

90. *Ibid.*, Article 92 and Annex III. For a serious infringement under Article 90(2)(p), the maximum number of points (7) shall be assigned.

91. *Ibid.*, Article 92(6) and (7).

and trigger the suspension or impossibility to apply for EU funding.⁹² These rules are particularly effective against forced labour in fisheries, as they not only target the material executor of the offence but also extend to the natural or legal person responsible for the fishing licence and benefiting from the offence. It is worth mentioning what the UNODC already observed in 2011: “it is likely that fishers, rather than the true masterminds behind the criminal activity, are held responsible for criminal activities such as migrant smuggling, illicit traffic in drugs and marine living resource crimes...”⁹³

The new rules are applicable to offences committed onboard all fishing vessels, including small ones (12 meters or below), representing over 80% of fishing vessels operating in Union waters.⁹⁴ This contributes, among other things, to better implementing paragraph 6.13 of the FAO Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries (‘the SSF Guidelines’), asking States to “adopt effective measures to protect fish and fish workers, including migrants, with a view to the complete elimination of forced labour in fisheries, including small-scale fisheries.”

As mentioned above, the legal and financial implications arising from the violation of the relevant CFP rules are not exempt from the more severe consequences that may result from any criminal proceedings initiated for the crime of forced labour. This is in accordance with the obligation of all States (both conventional and customary) to eliminate the use

92. E.g., Article 11 of Regulation (EU) 2021/1139 on the European, Maritime, Fisheries and Aquaculture Fund, and Commission Delegated Regulation (EU) 2022/2181.

93. UNODC, ‘Transnational Organized Crime in the Fishing industry. Focus on: Trafficking in Persons, Smuggling of Migrants, and Illicit Drugs Trafficking’ (UN, 2011), 129.

94. Sebastian Villasante (et al.), ‘Chapter 5. The implementation of the landing obligation in small-scale fisheries of southern European Union countries’, 91, in Sven Sebastian Uhlmann (et al.), *The European Landing Obligation* (2019, Springer Open).

of forced labour within their territory, waters, and on vessels flying their flag, and to cooperate towards this goal.⁹⁵

4.1.3 Fishing activities with the use of forced labour and UNCLOS

Academic literature has extensively discussed human rights in relation to UNCLOS, particularly in recent years.⁹⁶ While the 1982 Convention is not precisely a human rights instrument, “human rights considerations are set in its normative structure”,⁹⁷ as some of its provisions do address the human rights implications of utilizing maritime spaces and resources, either directly or indirectly.⁹⁸ This link has been emphasized by international courts and tribunals, including the International Tribunal for the Law of the Sea (ITLOS).⁹⁹ Additionally, the examination of human

95. Bianca Haas (et al.), ‘Untangling Jurisdictional Complexities for Crew Labour Regulations on Fishing Vessels in Western and Central Pacific Ocean’ (2023) *The International Journal of Marine and Coastal Law* 38, 1-20, 667; Oona A. Hathaway, ‘Brief of Yale Law School Center for Global Legal Challenges as Amicus Curiae in Support of Respondents, Nestlé USA, Inc. v. Doe & Cargill, Inc. v. Doe’ (2021) *Just Security* series 20.

96. E.g., Bernand H. Oxman, ‘Human rights and the United Nations Convention on the Law of the Sea’ (1997) 36 *Colum. J. Transnat’l L.* 399-429, 401; Chris Whomersley, ‘UNCLOS at 40: What about human rights?’ (2023) *Marine Policy*, Vol. 148; Tafsir Malick Ndiaye, ‘Human Rights at Sea and the Law of the Sea’ (2019) *Beijing Law Review*, 10, 261-277, 269; Naama Omri and Gershon Hasin, ‘Rethinking Ocean Exclusivity: The case of Human Rights’ (2023) *U. Pa. J. Int’l L.*, Vol. 44:4, 947-1005, 956.

97. Ndiaye (n 96).

98. *Ibid.* See also, Sofia Galani, ‘Assessing Maritime Security and Human Rights: The Role of the EU and its Member States in the Protection of Human Rights in the Maritime Domain’ (2020) *The International Journal of Marine and Coastal Law* 35 (2020) 325-347, 332.

99. Anna Petrig and Marta Bo, ‘The International Tribunal for the Law of the Sea and Human Rights’, 353-411, in Martin Scheinin, *Human Rights Norms in ‘Other’ International Courts* (CUP, 2019).

rights should be considered within the broader framework of the law of the sea architecture.

UNCLOS recognises the exclusive rights of a coastal State to regulate fisheries in its internal waters, territorial sea, archipelagic waters, EEZ and continental shelf.¹⁰⁰ The relevant provisions arguably reflect customary international law.¹⁰¹ Further details on the content of those rights are laid down in Part V of UNCLOS. In particular, Article 62(4) of UNCLOS provides coastal States with the authority to establish certain fishing conditions (e.g., licencing, use of gear, training) onboard fishing vessels operating in their EEZ. The list of conditions in Article 62(4) does not expressly refer to labour aspects or conditions, although the former is not meant to be exhaustive ('inter alia'). In that respect, the case-law of ITLOS recognised the right of a coastal State to set conditions that are relevant for fisheries, even if they are not specifically mentioned by the Convention (e.g., on shipboard processing and bunkering).¹⁰² The legal justification behind this broad interpretation lies in the functional nature of the coastal State's rights to regulate fisheries. In other words, given the impact that certain activities may have on the exclusive fisheries rights of a coastal State, the latter should be allowed under UNCLOS to adopt and enforce national rules to regulate such activities by and onboard fishing vessels, including foreign ones, operating in its waters. It follows that the adoption by a coastal State of fishery rules addressing, among other things, forced labour on board fishing vessels operating in its waters would be enforceable by

100. UNCLOS, Articles 2, 21, 49, 56, 61-62, 73 and 77. Churchill, Lowe and Sander (n 9) 513-599.

101. See Roach (n 8) and Hudson (n 8).

102. E.g., *M/V "Virginia G"* case (Panama v. Guinea-Bissau), Merits, Judgment, ICGJ 452, ITLOS Case No. 19, 14th April 2014, International Tribunal for the Law of the Sea (ITLOS), 67-70 ¶ 211-223.

the same State, in accordance with its sovereignty and sovereign rights to regulate fisheries.¹⁰³ Evidently, any enforcement power exercised by a coastal State for that purpose should be in line with UNCLOS and international law.¹⁰⁴

There is an underlying legal question, however, revolving around the jurisdictional nature of the enforcement powers and responsibilities of a flag State for certain labour violations (including those related to forced labour in fisheries) committed on board vessels flying its flag that operate in the waters of a coastal State, in a way therefore inconsistent with its fishery laws and regulations.¹⁰⁵ The issue is reflected in a recent ILO (et al.) report identifying “complicated legal jurisdictions for the enforcement of labour and human rights” between coastal and flag States as one of the causes of forced labour in fisheries.¹⁰⁶ In other words, who is responsible for fisheries enforcement on board foreign vessels operating in the coastal State’s waters? Is it the coastal State or the flag State of those vessels?

This jurisdictional dilemma is compounded by a strict interpretation of Article 94 of UNCLOS, which would recognise States with primary jurisdiction and control over all labour issues on board fishing vessels

103. Bianca Haas (et al.) (n 95) 666; Mercedes Rosello, ‘Disordered Legal Pluralism and Legal Security in Internationally Shared Fisheries’, 52, in Pierandrea Leucci, Ilaria Vianello, *ASCOMARE Yearbook on the Law of the Sea. Volume 2: Fisheries and the Law of the Sea in the Anthropocene Era* (Luglio Editore, 2022) 58-59.

104. Pierandrea Leucci, ‘Enforcing Fishery Legislation in the Exclusive Economic Zone of Non-Parties to UNCLOS’, 317-381, in Pierandrea Leucci and Ilaria Vianello (eds.), *ASCOMARE Yearbook on the Law of the Sea. Volume 1: Law of the Sea, Interpretation and Definitions* (Luglio Editore, 2021).

105. UNCLOS, Article 92(1). See also, Myron H. Nordquist, Neal R. Grandy, Satya N. Nandan, and Shabtai Rosenne, United Nations Convention on the Law of the Sea of 1982: A Commentary, Volume II (Brill/Nijhoff, 1993), Article 1.

106. ILO (et al.) (n 29) 33.

flying their flag, irrespective of where they operate.¹⁰⁷ Because of that, some may argue that the responsibility for enforcing forced labour's provisions on foreign fishing vessels operating in the waters of a coastal State should lie with the flag State of that vessel.¹⁰⁸ Still this is not the case, at least insofar as three fundamental conditions are met: (a) the relevant forced labour's provisions are incorporated in the *fishery* legislation of the coastal State;¹⁰⁹ (b) those provisions are either directly or indirectly linked with fisheries, including with the conservation and management of the coastal State's marine living resources; and (c) *fishery* rules adopted for that purpose only apply to foreign fishing vessels authorised to fish in the coastal State's waters or otherwise illegally engaging in fishing activities therein.

The flag State would retain certain enforcement powers on vessels flying its flag, especially to uphold its due diligence obligation for activities carried out by them in the coastal State's waters.¹¹⁰ Yet, fishing activities in the waters of a coastal State are subject to compliance with the terms and conditions established by it.¹¹¹ Hence, a breach of the relevant terms and conditions by a foreign vessel would allow the coastal State concerned to take the measures of enforcement necessary to ensure compliance with its fishery law, including inspection, boarding, arrest,

107. Ibid., Article 94(3)(b).

108. Lewis (et al.) (n 26) 387; and Ridings (n 26) 22.

109. M/V "Virginia G" case (n 102) 71, para 224.

110. Request for an Advisory Opinion submitted by the Sub-Regional Fisheries Commission, Advisory Opinion, 2 April 2015, ITLOS Reports 2015, p. 4; and UNCLOS, Article 94(6). See also South China Sea arbitration (Philippines v China), Final Award, PCA Case No 2013- 19, ICGJ 495 (PCA 2016), 12th July 2016.

111. Ibid., Article 62(4). See also, Ridings (n 26) 13; and Steven Haines, 'Developing Human Rights at Sea', in Aldo Chircop (et al.), *Ocean Yearbook 35:18-51* (2021), 41-2.

the institution of judicial proceedings,¹¹² and confiscation.¹¹³ A different interpretation would deprive the relevant coastal State's laws and regulations of its teeth, particularly when fishery offences are committed by vessels registered in countries with poor flag State performance (e.g., open registers or flag of convenience). Moreover, a flag State-centric approach would contradict other provisions of UNCLOS and relevant case law, which give coastal States exclusive and functional rights to regulate fisheries in their waters.¹¹⁴ This aligns with the holding of ITLOS in its 2015 Advisory Opinion on IUU fishing, which explicitly recognised the primary responsibility of the coastal State to prevent, deter and eliminate illegal fishing (covering any violation of national fishery law) in its waters, including by taking all necessary enforcement measures for that purpose. This condition, as explained by ITLOS, does not release "oth-

112. E.g., UNCLOS, Articles 62(4)(h) and 73(1). This is true also in the territorial sea, although not specifically mentioned by UNCLOS. In fact, a narrow interpretation of Article 27 of the Convention, limiting the power of coastal States to exercise criminal jurisdiction on board foreign vessels passing through the territorial sea, would not be acceptable for at least two reasons: first, a similar power is already recognised by UNCLOS in Article 73(1) for fishery offences committed in the EEZ (where the sovereign authority of the coastal State should be weaker than the one in the territorial sea). Second, Article 27(1)(a) still recognises the criminal jurisdiction of the coastal State whenever the consequences of any crime committed onboard foreign vessels "extend to the coastal State". No doubt exists, in that respect, that engaging in any act of illegal fishing with the use of forced labour in the territorial sea of a coastal State would result in negative consequences (e.g., overfishing, unfair competition) for the latter.

113. See also *Tomimaru case* (Japan v. Russian Federation), Judgment, Prompt Release, ITLOS Case No 15, ICGJ 419 (ITLOS 2007), 6th August 2007, International Tribunal for the Law of the Sea (ITLOS), 23 ¶ 73. See also, *M/V "Virginia G" case* (n 102), 77-78 ¶ 253-257.

114. It should be noted, in that respect, that the coastal State's competence to exercise enforcement against foreign fishing vessels for the violation of its fisheries law and regulations is already recognised in respect of certain social, technical or administrative conditions, expressly mentioned in Article 94 of UNCLOS (e.g., training). The fact of those conditions being mentioned in Article 94 of UNCLOS does not make them *ipso facto* enforceable exclusively by the flag State, if other provisions of UNCLOS (and international law) indicate otherwise.

er States from their obligations in this regard”.¹¹⁵ Instead, it establishes a hierarchical system of jurisdictional powers and competences at sea, which are essential for effectively enforcing the applicable fishery law and assessing compliance with the relevant conservation and management duties under UNCLOS.¹¹⁶

4.2 Fisheries control tools and technology

In line with the objective of the 2018 Commission proposal, the Control Regulation was also amended to introduce requirements on the tracking of fishing vessels, as well as to improve the monitoring of compliance with the special discard ban rules (i.e., the landing obligation) set out under the CFP Basic Regulation.¹¹⁷

Regarding vessel tracking, the revised Control Regulation extends the requirement for all fishing vessels to be equipped with a fully functioning VMS or other tracking device, including those that were previously exempted due to their small size.¹¹⁸ Fishing vessels that have a VMS or other tracking device must transmit their location, course, and speed data at regular intervals (at least every 2 hours)¹¹⁹ to the competent authorities of

115. ITLOS Advisory Opinion (n 110) 33-34 ¶ 105-108. See also, ILO (n 21) 9.

116. For a better understanding of the jurisdictional tensions related to the enforcement of human rights on board foreign vessels operating in the coastal State's waters, see Irini Papanicopolulu, 'Human Rights and the Law of the Sea', in David Joseph Attard (et al.), *The IMLI Manual on International Maritime Law: Volume I: The Law of the Sea* (OUP, 2014), 19.

117. CFP Basic Regulation, Article 15.

118. According to Article 9(2) and (5) of the Control Regulation (pending the application of the new amendments to Article 9, between 2026 and 2030), fishing vessels below 12 meters are excluded from the VMS obligation, while certain vessels between 12 and 15 meters could be exempted from the obligation under certain conditions.

119. Commission Implementing Regulation (EU) No 404/2011, Article 22. Shorter periods for the frequency of transmission of VMS can be set under specific rules, e.g. for vessels operating in fishing restricted areas (Article 50 of the Control Regulation).

their flag State. These authorities will then automatically make the data available to the coastal State for activities conducted in its waters.¹²⁰ The new tracking requirements will be implemented in a phased approach, starting with fishing vessels below 12 meter in 2026,¹²¹ and certain fishing vessels below 9 meters operating very close to the shore in 2030.¹²²

The revised Control Regulation also introduces provisions concerning fishing vessels above 15 meters¹²³ switching off their AIS for exceptional reasons (e.g., piracy risks). AIS is a radio-based tool used to geolocate vessels, originally developed to improve maritime safety and prevent collisions at sea. Today, it also plays a very important role as fisheries monitoring tools, including for control, inspection and cross-checking purposes.¹²⁴ Unlike VMS data, AIS data is openly accessible, as it can be automatically collected through a Very High Frequency (VHF) radio-transponder installed on ships or on land, and is usually transmitted every few minutes.¹²⁵ The new Article 10(2) of the Control Regulation, which applies from 9 January 2024, requires the master of fishing vessels equipped with an AIS to inform its flag Member State about the reasons for switching off the system, and to restart the AIS as soon as the source

120. Control Regulation, Article 9(5) and (7).

121. Ibid., Article 9(2) and (3), and Amending Regulation (XXXX), Article 7(2).

122. Ibid., Article 9(4).

123. According to Article 10(1) of the Control Regulation and Annex II of Directive 2002/59/EC, all fishing vessels above 15 meters shall have installed onboard a fully functioning AIS system.

124. Pascal Thoya (et al.), 'AIS and VMS ensemble can address data gaps on fisheries for marine spatial planning' (2021) *Sustainability*, 13(7), 3769, 1-12; Mark James (et al.), 'AIS data to inform small scale fisheries management and marine spatial planning' (2018) *Marine Policy*, Vol. 91, 113-121; and Jennifer L. Shepperson (et al.), 'A comparison of VMS and AIS data: the effect of data coverage and vessel position recording frequency on estimates of fishing footprints' (2017) *ICES Journal of Marine Science*, Vol. 75, Issue 3, 988-998.

125. Daniel C. Dunn (et al.), 'Empowering High seas governance with satellite vessel tracking data' (2018) *Wiley Fish and Fisheries*, 2018, 1-11.

of danger has disappeared. The provision is based on the voluntary procedures outlined in the ‘Revised Guidelines for the Onboard Operational Use of Shipborne Automatic Identification Systems’, adopted on 2 December 2015 under the auspices of the IMO.¹²⁶

Lastly, Article 13 of the revised Control Regulation provides for the mandatory installation of REM systems, including CCTVs, onboard fishing vessels of 18 meters or above that pose a high risk of non-compliance with the rules on the landing obligation.¹²⁷ Member States may also allow for the use of cameras onboard their flagged vessels for purposes other than controlling compliance with discards rules.¹²⁸ The new requirements will apply from January 2028¹²⁹ and are complemented by important provisions on the protection of personal data, which should be read in the context of the other provisions of the Control Regulation and those laid down by Regulation (EU) 2016/679.¹³⁰

While the mentioned control technology is not entirely novel, its expanded and modernised implementation plays a key role in enhancing fisheries control and enforcement, ultimately promoting sustainability and benefiting the CFP as a whole. This is particularly true when the same control technology is used to collect evidence and detect behaviours to profile fishing vessels with a higher risk of forced labour onboard, including (1) vessels spending a very long time at sea, in isolation,

126. IMO Resolution A.1106(29), 2 December 2015. Paragraph 22 of the Annex, in particular, provides for procedures that are similar to those laid down by Article 10(2) of the Control Regulation, although in a non-mandatory language.

127. CFP Basic Regulation, Article 17.

128. Control Regulation, Article 13(6).

129. Amending Regulation (EU) 2023/2842, Article 7(7).

130. Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).

and largely relying on support vessels and transshipment (prohibited in EU waters)¹³¹ for operational purposes; (2) vessels making ports of call only or predominantly in countries with a high slavery risk (Global Slavery Index)¹³² or where fishery control is very poor; (3) vessels engaging in IUU fishing, including those placed on RFMOs provisional IUU vessels lists, and/or in other illegal activities at sea (e.g., illegal trade of sensitive species or drug trafficking); and (4) vessels regularly failing to transmit VMS and/or AIS data (i.e., ‘going dark’) and using other types of deceptive techniques.¹³³

A study conducted by McDonald (et al.)¹³⁴ on 16,261 industrial fishing vessels relying on vessel monitoring data shows that “fishing vessels using forced labour behave differently than the rest of the global fishing fleet.”¹³⁵ Despite some criticism of the findings and models used in that study,¹³⁶ the research opens up a technical debate and builds momentum on the role played by vessel monitoring data, remote sensing, and machine learning in identifying patterns of behavioural

131. Control Regulation, Article 20(1).

132. A flagship’s report published every year by the Walk Free Foundation providing ‘national estimates of modern slavery for 160 countries.’ It is worth mentioning also the analysis of the Global Slavery Index data made by Seafish to quantify the risk of modern slavery and forced labour in top-seafood exporters and producers, available at <<https://www.seafish.org/document/?id=f7a7288d-35f5-4b5c-a6bb-6f8f4bd3fc16>>.

133. Priyal Bunwaree, ‘The Illegality of Fishing Vessels Going Dark and Methods of Deterrence’ (2023) *International and Comparative Law Quarterly*, Vol. 72, Issue 1, 179-211, 192.

134. Gavin G. McDonald (et al.), ‘Satellites can reveal global extent of forced labour in the world’s fishing fleet’ (2021) *PNAS* 2021 Vol. 118 No. 3.

135. *Ibid.*, 3.

136. Wilf Swartz (et al.), ‘AIS-based profiling of fishing vessels falls short as a “proof of concept” for identifying forced labour at sea’ (2021) *PNAS* 2021 Vol. 118 No. 19; and Lozano (et al.) (n 4) 3. See also McDonald (et al.) reply to Swartz (et al.), Gavin G. McDonald (et al.), ‘Reply to Swartz et al.: Challenges and opportunities for identifying forced labor using satellite-based fishing vessel monitoring’ (2021) *PNAS* 2021 Vol. 118 No. 19.

features.¹³⁷ These patterns could be considered by States to strengthen their risk analysis for inspection and control purposes.¹³⁸ Accordingly, in the announcement letter for a new scoping study presented by the FAO Secretariat during the 5th session of the Joint FAO/ILO/IMO Working Group on IUU fishing and related matters (Geneva, January 8-12, 2024), the Secretariat noted that “using advancement in data technology, particularly through analysing fishing vessels” behaviours using different information sources, holds significant potential in detecting instances of labour exploitation onboard these vessels.¹³⁹

5. Maritime security, forced labour and fisheries control

There is not a universally agreed-upon definition of ‘maritime security’. As early as 2015, Bueger observed that trying to define this term universally would likely be “an unproductive quest”.¹⁴⁰ This is mostly due to the complexity underlying the abstract qualification of security, including security of and from ‘whom’ or ‘what’ and, in particular, ‘where’ and ‘why’ security is needed. What constitutes security may change over time and adapt to regional contexts, different security actors, specific challenges

137. Fernando Paolo (et al.), ‘Satellite mapping reveals extensive industrial activity at sea’ (2024) *Nature*, Vol 625, 85-91, 85; and Stefan Partelow (et al.), ‘Ocean Governance for Sustainability Transformation’, 13, in Stefan Partelow (et al.), *Ocean Governance. Knowledge systems, policy foundations and thematic analyses* (Springer, 2023).

138. Lozano (et al.) (n 4) 3.

139. FAO Secretariat, ‘Safety and Working Conditions in the Fishery Sector’, FAO/ILO/IMO, Joint Working Group on IUU Fishing and related matters, 5th session, 8-12 January, 2024, Geneva.

140. Christian Bueger, ‘What is Maritime Security?’ (2015) *Marine Policy* 53, 159-164, 163.

and policy objectives of States, depending on the circumstances of the case.¹⁴¹ A universal understanding of security, consequently, is not easy to grasp. Yet, at least two things are clear when we refer to maritime security.

First, security at sea is inherently linked to the use of maritime spaces and resources, their conservation status, and the potential impact that activities could have, either directly or indirectly, on these spaces and resources. This includes security considerations associated with fisheries,¹⁴² such as the security impact of fishing activities conducted using forced labour.

Second, protection from insecurity is a logical and necessary condition for the realization of security at large, whether on land or at sea.¹⁴³ In order for security to exist in practice, the sources of insecurity need to be prevented, removed, or otherwise kept under control. Certain unlawful behaviours, such as piracy, terrorism, marine pollution, and IUU fishing, are generally understood as posing a concrete security threat.¹⁴⁴ These behaviours are connected with specific security interests (e.g., socio-eco-

141. Natalie Klein, 'Maritime Security', 593-4, in Donald D. Rothwell, *The Oxford Handbook on the Law of the Sea* (OUP, 2015).

142. Rosello (n 103); Richards Barnes and Mercedes Rosello, 'Fisheries and Maritime Security: Understanding and Enhancing the Connection', 18, in Malcolm D. Evans and Sofia Galani *Maritime Security and the Law of the Sea. Help or Hindrance?* (Edward Elgar, 2019); Kyle Fawkes (et al.), 'Leveraging International Fisheries Law for Maritime Security in the Anthropocene: Addressing Conflicts in Fisheries', in Pierandrea Leucci and Ilaria Vianello, *ASCOMARE Yearbook on the Law of the Sea. Volume 2: Fisheries and the Law of the Sea in the Anthropocene Era* (Luglio Editore, 2022) 58-59; and Christian Bueger, 'What is Maritime Security?' (2015) *Marine Policy* 53, 159-164, 162.

143. The term 'security' comes from the Latin word *securus*, meaning 'safe' or 'free from danger.'

144. UN General Assembly, Sixty-Third Session, Item 73(a), Oceans and the Law of the Sea, Report of the Secretary General (A/63/63), 10 March 2008, ¶39, 15. See also, Christian Bueger, 'Learning from piracy: future challenges of maritime security governance' (2015) *Global Affairs*, 1:1, 33-42, 35; Klein (n 141) 583 and 590; Rosello (n 103) 52-53; and Ademun-Odeke, 'Challenges of Apprehending and Prosecuting Somali Pirate Leaders and Financial Backers: the *Big Mouth* Case' (2023) 29 *JIML*, 165-183, 173-174.

conomic, environmental, financial, military, territorial), which contribute to shaping the content of a collective security paradigm that affects the lives of people and States. In that sense, maritime security can be described as an optimal state or condition where all the relevant security interests are balanced against the risk posed by the corresponding security threats, including the overall risk resulting from their interaction and evolutionary adaptation.¹⁴⁵ Hence, identifying and managing security threats, as well as understanding their causes and ramifications in modern society and international law is key to achieving a legal order for the seas and the oceans, as purported by UNCLOS.¹⁴⁶ This is where, in the author's view, a positive (achieving a legal order) and negative (eliminating security threats) conceptualization of maritime security eventually meet.

Forced labour in fisheries constitutes a security threat for people and States,¹⁴⁷ particularly due to the nature of this offence and its socio-economic implications. Successfully curbing forced labour in fisheries is likely to decrease overfishing, unfair competition, and conflicts over resource access. It will also improve food security, employment, and transparency throughout the supply chain. Additionally, it will help mitigate the security risk posed by other associated offences, such as human trafficking and IUU fishing, just to mention a few positive outcomes.

Rules on control, inspection, sanctions and enforcement, as well as the use of tracking devices and remote sensing, are useful to address security threats related to fisheries, such as those posed by vessels engaging

145. Bueger (n 140) 39.

146. UNCLOS, PP5: "Recognizing the desirability of establishing through this Convention, with due regard for the sovereignty of all States, a legal order for the seas and oceans which will facilitate international communication, and will promote the peaceful uses of the seas and oceans, the equitable and efficient utilization of their resources, the conservation of their living resources, and the study, protection and preservation of the marine environment..."

147. Rosello (n 103) 53; Galani (n 98) 330.

in fishing activities with the use of forced labour. The same control rules and tools support the work of Union and national authorities to monitor and enforce compliance with the CFP policy objectives, including its zero-tolerance strategy against IUU fishing.¹⁴⁸ This aspect is also reflected in points 1.2.8 and 1.2.9 of the revised EU Maritime Security Strategy (2023), urging Member States and the European Commission to promote maritime security by reinforcing and coordinating their actions to eliminate forced labour at sea vis-à-vis the fight against IUU fishing.¹⁴⁹

6. Conclusion

We looked at how social fisheries management can be relevant for and covered by the CFP rules, and what the role of fisheries control and enforcement is to ensure compliance with these rules and their objectives. We explored and discussed the new provisions on inspection and sanctioning against forced labour in fisheries, including in the context of the jurisdictional powers provided by UNCLOS. Then, we addressed the possible use of fisheries control tools and technology to further develop the risk analysis for inspection and control purposes, and concluded that enhancing compliance with the CFP can have a positive impact on maritime security, which is understood as a cluster of security interests with a maritime dimension.

Forced labour in fisheries is a global security issue. Effectively eliminat-

148. European Commission, *Farm to Fork Strategy. For a fair, healthy and environmentally-friendly food system* (20 May 2020) 18.

149. European Commission, Annex to the Joint Communication to the European Parliament and to the Council on the update of the EU Maritime Security Strategy and its Action Plan “An enhanced EU Maritime Security Strategy for evolving maritime threats” (JOIN(2023)8 final), 10 March 2023.

ing it requires coordinated action among States, national authorities, and different areas of EU policies, including the CFP. The revised fisheries control system strengthens the collective/EU security paradigm by improving compliance with the CFP, including its social dimension, and by internalizing relevant human rights considerations into the fishery legislative framework.

The new rules help to crack the jurisdictional dilemma (coastal State vs flag State) under UNCLOS and bring order to the normative chaos caused by the pluralism of fishery and non-fishery sources, for the benefit of security overall.¹⁵⁰ Implementation, starting from January 2026, is key. For that, Member States should not only adopt the necessary legislation and notify it to the Commission by 10 April 2026¹⁵¹ but also ensure that fisheries inspectors are duly trained,¹⁵² strengthen inter-service cooperation and coordination (e.g., between fisheries and labour authorities) to ensure the necessary follow-up of any suspected infringement under Article 90(2)(p), and reinforce their data collection and cross-checking system, including by using and, where possible, extending the scope of application of control tools and technology (e.g., VMS, AIS, and CCT-Vs) to detect fishing activities carried out with the use of forced labour. Ensuring the full implementation of the new rules and promoting a human rights-based approach in fisheries will contribute to preserving the human-fish nexus,¹⁵³ upon which the sustainable use of marine biological diversity – and therefore maritime security – depends.

150. Rosello (n 103).

151. Amending regulation 2023/2842, Article 89(3).

152. Ibid., Article 74(5).

153. Chin-Chia Thien (n 1).

Concluding Remarks

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The relationship between maritime security and new technology is a dynamic and ever-evolving process. Technologies such as satellite surveillance, unmanned vehicles, and advanced communication systems have significantly enhanced the capabilities of both States and non-State actors in pursuing activities at sea and ensuring maritime security. These technologies enable better monitoring and tracking of vessels, identification of potential threats, and faster response to security incidents, among other benefits. However, they also introduce new challenges and vulnerabilities in the law of the sea, which necessitates attention from international law.

The collection of articles presented in this volume delves into the link between the law of the sea and the use of technologies, focusing on their security and ethical implications. This exploration is set against the backdrop of the UN Convention on the Law of the Sea (UNCLOS) and other relevant sources.

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The volume begins with two contributions from Judges of the International Tribunal for the Law of the Sea (ITLOS).¹ The first chapter examines the revisited meaning and scope of maritime piracy in light of modern technological developments and practices (Kateka). The second chapter investigates the ‘military activities’ exemption under UNCLOS, which raises questions about the evolving security threats associated with the militarisation of the seas (Kulyk).

These contributions are followed by a critical analysis of the evolution of maritime spaces into global infrastructures and the impacts of sea urbanisation on States’ maritime security agendas (Bueger). In this new digital era, which is gradually shifting away from the concept of physical reality, there is cause for reflection on the opportunity to reassess the connection between law and science within the broader framework of the law of the sea (Lewis). The investigation of AI-driven systems and datafication in disputed maritime areas (van den Hoven), alongside the use of control tools and technology to detect forced labor in fisheries (Leucci), offer compelling illustrations of the significance of examining maritime security threats and the law of the sea through a critical and progressive perspective. A similar account can be made regarding the prospect of reconciling navigational rights and freedoms with the legal regime of automated naval vehicles, for which the advisory jurisdiction of international courts or tribunals may come in handy (Sumer).

However, some authors have emphasised that the use of technology in maritime security must be balanced with respect for privacy and human rights, ensuring the necessary level of accountability under national and international law, among other things.

It is against this background that a question arises: how do we draw a line between what is legally possible and what is ethically acceptable? The risk of automating procedures, such as those concerning search and

1. Judge James L. Kateka (2005-2023) and Judge Markiyani Z. Kulyk (2011-to date).

rescue operations at sea, needs to be addressed through the establishment of rules and standards for intervention and cooperation consistent with the protection of human rights (Partipilo). These rules and standards should take into account the impact of new technology on fulfilling international law obligations and the responsibility of those who rely on it (Bevilacqua). In achieving this, the promotion of knowledge sharing and the democratization of technology, particularly by bridging the North-South technological gap, is crucial (Aman Eddine, Guliyeva).

This volume has demonstrated how maritime security, new technology, and the law of the sea are intricately interconnected in the modern maritime domain. The authors argue that by embracing innovation while upholding legal and ethical principles, the international community can effectively address maritime security challenges and promote a safer and more secure maritime environment for all. In particular, this volume has highlighted the ethical implications associated with the use of new technology at sea, emphasising the importance of considering privacy rights, liability, environmental sustainability, resource management, and global equity. Therefore, it is essential to adhere to an international legal framework that addresses the use of new technologies, allowing us to harness the benefits of maritime technology while minimising its potential risks and negative impacts on society and the environment.

We hope that the contributions made by the authors in this volume may inspire further discussion, work, and research on the topic.

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