

“Information Fusion”: A Lever of Maritime Power for France?

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▶ Key Takeaways

- In an increasingly interconnected world, maritime tensions related to sovereignty issues, the environment and the preservation of energy and trade flows are multiplying.
- The concepts of Geospatial Intelligence (GEOINT) and Maritime Domain Awareness (MDA) provide a flexible and modular framework for states to develop a common understanding of maritime threats and their evolution.
- MDA supports at least three of the strategic functions identified in the 2022 National Strategic Review: prevention, knowledge-understanding-anticipation and influence.
- A “national plan” and interministerial governance, specifically dedicated to these issues, would rationalize a fragmented system and enhance France’s role as a maritime power at the international level and a European hub at the regional level.

Introduction

France is a seafaring nation. The stability of its national economy, trade, and security are inextricably linked to the maritime character of international trade. Yet the world’s seas and oceans have always lent themselves to various illegal activities due to their immensity, remoteness, and the freedom of navigation that characterizes their legal regime. The sea offers a wide range of potential targets for terrorism or piracy, including merchant vessels, offshore platforms, and submarine cables, the destruction or disruption of which would inflict colossal physical and economic damage. The deliberate use of the maritime domain to commit harmful, hostile, or illegal acts, including against the maritime transportation system, is now a constant threat.

In 2003, the US developed an “information dominance” strategy that gave rise to Geospatial Intelligence (GEOINT). This discipline enables the collection, processing, and dissemination of geo-referenced and geospatial information via the fusion of multi-layer and multi-sensor data. Since 2007, technological innovations, as well as new regulations resulting from the Safety of Life at Sea (SOLAS) Convention, have gradually increased the amount of usable data, as well as our ability to monitor and control activities at sea, while simultaneously developing the maritime aspects of GEOINT.

Against this backdrop, the US developed the concept of maritime domain awareness (MDA).¹ In the US, MDA is understood as a shared approach to maritime threats and changes therein, incorporating several actors to better facilitate coordination and cooperation between the various organizations responsible for security at sea, at the national and international levels. The International Maritime Organization (IMO) defines MDA as “the effective understanding of anything associated with the maritime domain that could impact security, safety, the economy or the marine environment.”²

This briefing calls for France to implement a “national plan” and an interministerial governance structure specifically for MDA. This reform would streamline the existing, scattered framework and contribute to at least three of the strategic functions cited in the 2022 National Strategic Review: prevention, knowledge-appreciation-anticipation, and influence.

1. “Enhancing Maritime Domain Awareness in West Indian Ocean and Gulf of Aden”, International Maritime Organization, November 14, 2018, available at: www.imo.org.

2. “Amendments to the International Aeronautical and Maritime Search and Rescue (IAMSAR) manual”, International Maritime Organization, May 25, 2012, available at: wwwcdn.imo.org.

The beginnings of GEOINT and MDA

Maritime GEOINT allows us to understand and analyze activities at sea, potential threats, and the opportunities presented by the world’s seas and oceans. In order to make the best use of these technologies, MDA “requires cooperation between various actors of the public and private sector, both at the national and international levels”.³

A comprehensive approach to seas and oceans

The creation, in 2003, of the National Geospatial-Intelligence Agency (NGA) in the United States was part of an ongoing effort to modernize information and command systems, promote a geographic approach to military operations, reduce decision times, and support advances in weapon systems.⁴

GEOINT relies on mapping, imagery, and data originating from various airborne, maritime, and land-based sensors, as well as real-time geo-location. It makes it possible to interpret gathered information according to operational needs.⁵ The NGA’s doctrine,⁶ published in 2006 (then again in 2012 and 2017), defines GEOINT as

“the exploitation and analysis of imagery and geospatial information to describe, assess, and visually depict physical features and geographically referenced activities on the Earth”, consisting of three pillars: imagery (optical sensors, infrared, radar, drones, AIS⁷/LRIT⁸, etc.), imagery intelligence (interpretation and analysis of imagery), and geospatial information (analysis based on the fusion of geolocated data).

This tool is becoming increasingly important in the military (e.g., strategic and operational planning, execution of operations) and civilian domains (crisis management, international negotiations).⁹ Between 2010 and 2015, more geospatial data fusion centers, both military and for civilian crisis management, were set up, such as the European Union Satellite Centre in 2003 or NATO’s Intelligence Fusion Centre in 2005.¹⁰

GEOINT consists of three pillars: imagery, imagery intelligence, and geospatial information

3. “Global Maritime Intelligence Integration Plan for the National Strategy for Maritime Security”, October 2005, p. 15, available at: irp.fas.org.

4. M. Alderton, “The Defining Decade of GEOINT”, *Trajectory Magazine*, US Group Intelligence Foundation, 2014, available at: trajectorymagazine.com.

5. P. Boulanger (ed.), *GEOINT et opérations : Actes du colloque en partenariat avec l’IHEDN, la Société de géographie de Paris et le Centre d’Intelligence artificielle (18-19 juin 2021)*, Sorbonne Université, Société de géographie, 2022, p. 117.

6. *Geospatial Intelligence in Joint Operations: Joint Publication*, National Geospatial Intelligence Agency, March 2, 2017, available at: irp.fas.org.

7. The Automatic Identification System (AIS) is a radio system used to transmit a vessel’s position and sailing information to other vessels equipped with an AIS and to authorities on land.

8. Data transmitted over the long-range identification and tracking (LRIT) system is limited to a ship’s position and identity.

9. P. Boulanger, “Geospatial Intelligence et géopolitique”, *Revue Défense Nationale*, Vol. 10, No. 795, 2016, pp. 103–108.

10. More information here: web.ifc.bices.org and www.satcen.europa.eu.

Since the late 2010s, changes in the geospatial sector with the rise of “New Space”¹¹ and the breaking down of barriers between geographic and intelligence professions have transformed GEOINT into a new science of geospatial information.

While this development has largely occurred in the context of air-land operations, especially in counterinsurgency campaigns such as Iraq, Afghanistan, Mali, and the Sahel, a maritime-specific GEOINT is beginning to emerge.

MDA as a means of unification and integration

The concept of MDA has gained significant traction in the United States since the attack on the *USS Cole* in Yemen in 2000, and even more so since the terrorist attacks of September 11, 2001.¹² In a security landscape characterized by terrorist attacks and with globalization driving a rapid increase in maritime traffic, US authorities pointed out that no federal agency had sole responsibility for developing an exhaustive knowledge of legal and illegal maritime activities. Indeed, no one agency could claim to be able to coordinate all maritime security activities itself, since transnational criminal threats, by their nature, require international and interagency cooperation.

Therefore, steps have been taken to coordinate the capabilities of the US Navy, the

In 2005, an initial National Plan to Achieve Maritime Domain Awareness was enacted in the US

US Coast Guard, maritime authorities, and Customs and Border Protection (CBP). In 2005, a National Plan to Achieve Maritime Domain Awareness was enacted to “achiev a more comprehensive and effective understanding of the maritime domain”.¹³ It was part of a series of support plans aiming to operationalize the US National Strategy for Maritime Security, which defines MDA as “the effective understanding of anything associated with the maritime domain that could impact the

security, safety, economy, or environment of the United States”.¹⁴ The plan was administered by the US Coast Guard and the Department of Homeland Security.

This conception of MDA relies necessarily on the development of procedures and language that is shared both between agencies and with maritime communities and partner countries.¹⁵ When executed properly, it is both an operational and diplomatic asset.

11. F. Gaillard-Sborowsky, *Géopolitique de l'espace: À la recherche d'une sécurité spatiale*, Paris: Le Cavalier Bleu, 2023; M. Luinaud, *L'Industrie spatiale*, Paris: PUF, 2023; G. Maral and M. Bousquet, *Satellite Communications Systems: Systems, Techniques and Technology*, Hoboken (New Jersey): John Wiley & Sons Inc., 2020.

12. S. C. Boraz, “Maritime Domain Awareness: Myths and Realities”, *Naval War College Review*, Vol. 62, No. 3, 2009, pp. 137–146.

13. “National Plan to Achieve Maritime Domain Awareness”, White House, October 2005, available at: www.dhs.gov.

14. Maritime strategy created in response to the U.S. National Security Presidential Directive. See: W. Kay, S. McFadden and M. Lincoln, “Global Maritime Integration: A Force Multiplier”, *The ONI Quarterly*, January 2007, pp. 4-7.

15. C. Bueger, “From Dusk to Dawn? Maritime Domain Awareness in Southeast Asia”, *Contemporary Southeast Asia*, Vol. 37, No. 2, 2015, pp. 157–182.

The challenge of information sharing between maritime stakeholders

MDA relies not only on GEOINT’s ability to technically exploit and operationally analyze data, but also on the development of civil-military partnerships on a scale befitting the circumstances (including the type of threat, and temporal and spatial scope).

The entanglement of MDA

The range of threats that MDA can identify is particularly broad, encompassing piracy and sea robbery; maritime terrorism; migratory activities; all forms of trafficking; illegal, unreported, and unregulated fishing (IUU);¹⁶ pollution; and the illegal exploitation of the seabed. The growing entanglement between acts of violence, environmental risks, and maritime security threats creates a complex landscape, which is the role of MDA to unravel. The ties between IUU fishing, drug trafficking, and sea robbery in Southeast Asia, for example, are well documented. The constantly shifting tactics used by traffickers and those trying to violate embargoes require similarly constant adaptation of analyses and operational responses.

Depending on the agreements in force and the needs of each party, the information exchanged between maritime actors may be limited to past incidents or include suspicious activities and “potential” incidents, such as the likely presence of a group of pirates in a particular location, in which case it can be used to issue alerts to the maritime communities affected and coordinate responses from the states concerned. Even if the information only covers past events, it allows actors to identify trends and tactics, which are particularly useful in deciding where to position state resources—i.e., preventive efforts—or in implementing active or passive measures for the security of maritime shipping.

The challenge of operationalizing data

The rise of big data and the growing use of artificial intelligence (AI) have yielded new industrial data use solutions. These include algorithms to detect and classify patterns of life (PoL) at sea¹⁷ as well as automated mapmaking solutions, making it possible to process data faster, as in the case of port activity monitoring. Ship movements, arrival and departure timetables, and cargo types can be analyzed in real time, helping to create maritime PoL specific to a given port and an accurate model of normal and abnormal activity.

16. “Illegal, Unreported and Unregulated (IUU) Fishing”, Food and Agriculture Organization of the United Nations, available at: www.fao.org.

17. Maritime PoL aim to understand behaviors and activities that have an impact on the maritime area.

If a significant deviation from the PoL is detected, systems can trigger automatic alerts to report abnormal behavior, such as suspicious activity or sudden changes from usual movement patterns. This use of AI and big data in maritime PoL detection significantly reduces data processing times and response times in the event of unusual or potentially dangerous events in the maritime domain.

Satellite imagery markets play a growing role in understanding the seas

In addition to maritime data markets, satellite imagery markets play a growing role in understanding the seas. At each geographical scale (whether continental, regional, or local), four things are necessary for maritime GEOINT to function:¹⁸ information about the data (e.g., timestamp, location, traceability thanks to metadata on its origin and nomenclature); a specific ecosystem (involving actors from governments, companies, and academic institutions); cartographical tools aimed at various actors, from political decision-makers to those at sea; and finally, visualization tools.

At a continental level, it enables the monitoring of major international maritime movements, using information on vessels' itineraries, the ports they visit, and trade flows. At a regional level, GEOINT can analyze fishing activities, providing detailed data on areas, seasons, and vessel behaviors and assisting in the fight against IUU fishing. Finally, at a local level, GEOINT can support environmental risk management efforts by mapping polluted areas or potential oil spills and providing real-time information to coordinate emergency responses.

The challenge of sensemaking

Variable-geometry information sharing

As much as MDA is a technical challenge, it is also a socio-political one. Given how it works, MDA raises questions of trust, organizational cultures, bureaucratic procedures, and political or other interests, which may diverge and hamper information sharing out of concern for confidentiality, whether of a state or a company. For example, it is difficult to maintain a dialog with Indonesia concerning sea robbery in the Singapore Strait or with Vietnam concerning IUU fishing.

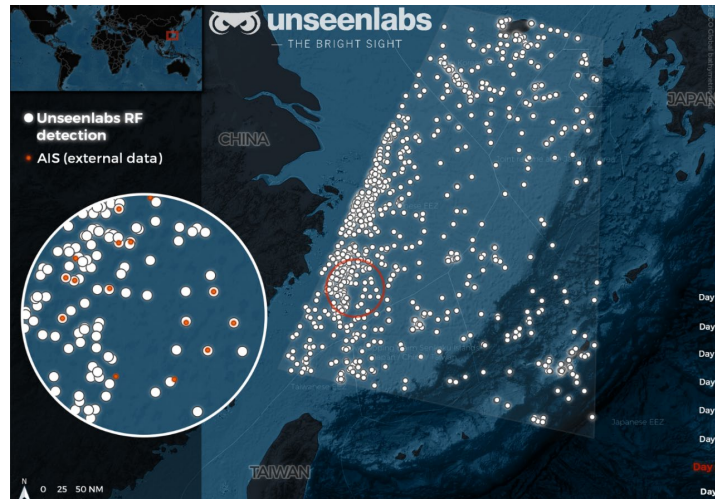
As a result, the level of information sharing among partners varies widely, both in its detail and frequency, depending on each stakeholder's operational needs, interests, and tendencies. Information sharing may, for example, be limited to agreements pertaining to “white shipping”, i.e., vessels that use AIS or LRIT to broadcast their positions, or may extend to “dark shipping”, meaning vessels that do not broadcast their positions and may therefore be involved in illegal activities. A study led by Unseenlabs¹⁹ found that

18. P. Boulanger, *La Géographie, reine des batailles*, Paris: Perrin, 2020.

19. Unseenlabs locates vessels by detecting and classifying their passive electromagnetic signatures, a method that enables the monitoring of any ship at sea. See their website: unseenlabs.space.

80 percent of ships in the East China Sea do not emit an AIS signal. This proportion would make information sharing that only includes white shipping insufficient to compile an exhaustive analysis of illegal activities in some regions.²⁰

Detecting ships with and without AIS in the East China Sea



Legend: Red dots indicate vessels with AIS and the white dots indicate vessels without AIS, but which were detected using passively emitted signals. Source: © UNSEENLABS, 2022.

A single interpretation: Necessary but challenging to achieve

As data and information don't speak for themselves, interpretation or “sensemaking” is necessary for MDA.

To say that “100 instances of sea robbery occurred in the Singapore Strait in 2022” does not, in itself, tell us anything about the problem or any potential solutions to it. It is necessary to paint a broader picture to place the statistics in the context of past trends, changes in the nature and density of maritime traffic, and the region's geopolitical landscape.

Interpretations of facts and trends remain fundamentally subjective and must be presented to other actors for different perspectives and analyses. Some types of incidents can create tensions or disagreements among partners and complicate this process of collective sensemaking.

For example, sea robberies in the Singapore Strait or IUU fishing in the South China Sea are particularly challenging to interpret due to tensions between the various state actors in the region, and it is rare to reach a common understanding of the facts. On the contrary, the former issue has become a recurring source of iciness between Indonesia and Singapore.

MDA offers a flexible, modular, and inclusive framework that France could benefit from in its operations and diplomacy in Europe and the Indo-Pacific.

A process of
“sensemaking” is a
necessary component
of MDA

20. “Unseenlabs Reveals Ships that Vanished from Conventional Geolocation Systems”, Unseenlabs, February 18, 2022, available at: unseenlabs.space.

Recommendations for France

A dedicated MDA strategy and governance would strengthen France’s maritime influence and international visibility, positioning it as a “European MDA hub” while contributing to three strategic functions outlined in the National Strategic Review: prevention, knowledge-appreciation-anticipation, and influence.

Streamlining MDA governance

Reporting to the prime minister, the *Secrétariat général de la Mer* (SGMer, General Secretariat of the Sea) coordinates projects concerning the government’s maritime policy.²¹ In this capacity, it publishes the National Strategy for the Security of Maritime Areas.²² Its Coast Guard Functions Operational Center (COFGC) is the interministerial²³ monitoring, alert, and analysis hub.

The General Secretariat for Defense and National Security (SGDSN) is responsible for planning national security measures. It works with SGMer to develop various interministerial instructions and plans,²⁴ such as the PIRATE-MER plan to combat maritime terrorism or the instruction regarding the voluntary naval cooperation (*coopération navale volontaire*, CNV) scheme²⁵ to bring users of the sea together with authorities to work on issues of maritime safety and security.

Within the Directorate General of International Relations and Strategy (DGRIS), the defense coordinator for the security of maritime spaces (*coordonnateur défense en matière de sécurité des espaces maritimes*, CSM) is tasked with developing and coordinating the Defense Ministry’s maritime domain policy.

Finally, the Maritime Information Cooperation and Awareness Center (MICA), which reports to the Deputy Chief of Staff of the French Navy in charge of operations (*sous-chef d’état-major de la Marine nationale en charge des opérations*, SCEM OPS), has been the center of French expertise in maritime security for shipowners since 2016. In particular, it is responsible for carrying out the voluntary naval cooperation program. It does not have its own analysts and relies upon the analyses of the “maritime information coordination cells,” which report to maritime prefects (*préfets maritimes*) and maritime

21. “Secrétariat général de la Mer (SGMer)”, French Government, available at: www.gouvernement.fr.

22. “Stratégie nationale de sûreté des espaces maritimes”, Office of the Prime Minister, December 10, 2019, available at: www.gouvernement.fr.

23. The seven bodies responsible for the coast guard function are represented at the Center: the navy, the maritime gendarmerie, the customs authority, the Directorate-General for Maritime Affairs, Fisheries and Aquaculture (DGAMPA), the national gendarmerie, the border police, and civil defense.

24. Interministerial instruction No.230/SGDSN/PSE/PSN/NP, June 28, 2022, available at: www.legifrance.gouv.fr.

25. Interministerial instruction No.165/SGDSN/PSE/PSN, April 29, 2019 and No.100/SGMer, April 29, 2019, concerning voluntary naval cooperation, available at: www.sgdns.gouv.fr.

zone commanders (*commandants de zones maritimes*).²⁶ These bodies are responsible for the regional fusion of interministerial data within their respective areas of responsibility and provide channels for information of military interest.

Despite this cross-functionality, the French system still lacks a dedicated interministerial ecosystem for MDA and the centralized fusion of maritime information.²⁷ The creation of a deputy minister post for MDA (*secrétaire général adjoint en charge du MDA*, SGMDA), reporting to SGMer, would bring some structure to a system that is currently too fragmented.

While inter-agency dialog and coordination with certain bodies can sometimes prove challenging for SGMer,²⁸ MDA cannot be managed by a single minister or agency. It requires a more structured model of coordination and information sharing between the French Navy, the Directorate-General of Customs and Indirect Taxes (DGDDI), and the Directorate-General for Maritime Affairs, Fisheries and Aquaculture (DGAMPA).

In collaboration with the SGDSN, the SGMDA could oversee the implementation of a national MDA plan to complement the National Strategy for the Security of Maritime Areas. To this end, it could rely on a COFGC strengthened in terms of both its responsibilities and resources (human and technical), on interministerial structures already in place in the maritime prefectures, and on existing centers of expertise such as the MICA Center.

Such a restructuring would promote the centralized convergence and fusion of the maritime GEOINT tools of each agency, subsequently increase efficiency and centralized coordination between institutional maritime actors, and finally improve the visibility and legibility of France’s actions at sea, not only for the maritime sector but for the European and international communities.

Becoming Europe’s hub for MDA

The case of Southeast Asia demonstrates the importance of having a regional hub capable of creating synergies between all of the existing structures in a given region. With multinational centers such as the IFC²⁹ or ReCAAP,³⁰ Singapore has now established itself as the MDA hub for Southeast Asia.

26. As government delegate, the Maritime Prefect is the direct representative of the Prime Minister. Vested with a general policing power, he has authority in all matters where France’s “state action at sea” (*action de l’État en mer*) policy applies, and thus coordinates relevant actions for all the relevant authorities.

27. Interviews conducted within the Defense Ministry in November 2023.

28. Interviews conducted within SGMer in November 2023.

29. The Information Fusion Centre (IFC) of Singapore, hosted by the Republic of Singapore Navy, has existed since April 2009 and now includes more than twenty countries. See their website: www.ifc.org.sg.

30. The Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAP) is a body created in 2006 with twenty-one signatory parties. See their website: www.recaap.org.

The French system still
lacks a dedicated
interministerial ecosystem
for MDA

France can gradually assert itself as the European MDA hub

While each region is different, Europe has a lot to learn from this region’s model, as no true MDA center exists in the EU. Only France’s MICA Center and Italy’s Virtual Regional Maritime Traffic Center (V-RMTC)³¹ conduct information-sharing programs, respectively with ship owners and participating navies, within the EU.

A COFGC with renewed capabilities, funding, and ambition could gradually bring together liaison officers from European navies and coastguards, making France Europe’s MDA hub and promoting information fusion between national agencies. The European Maritime Safety Agency (EMSA)³² would likely be able to provide financial support for such a step up.

Creating an MDA community

As the term is understood in the US, MDA is primarily about tools developed nationally by relevant agencies and services but also about information provided by the maritime sector (including shipowners, charterers, operators, and port infrastructure providers) and by partner nations.

An operational connection has already been established with the maritime sector in the form of voluntary naval cooperation (CNV) schemes supervised by the MICA Center. On the other hand, at the international level, while France has some bilateral, technical information-sharing agreements with partner states, especially in the Indo-Pacific, many of them are rarely implemented due to a lack of coordination in applying them (with some still being administered separately by SGMer, DGRIS, maritime zone commanders, and the French Navy³³), dedicated human resources, or a shared geographic information system (GIS).³⁴

A strengthened COFGC could also include an office responsible for administering and leading civil-military agreements and partnerships. Another office could initiate and support projects with academia and industry to promote innovation in maritime GEOINT, according to the needs identified by the Deputy Minister for MDA (SGMDA), particularly with regard to big data and AI.

31. A virtual network connecting the maritime operation centers of member navies. Its hub is in Rome, at the Italian Maritime Operation Center of the Fleet Command Headquarters (CINCNAV). See their website: www.marina.difesa.it.

32. The EMSA’s mission is “to serve EU maritime interests for a safe, secure, green and competitive maritime sector”, available at: www.emsa.europa.eu.

33. Interviews conducted within the Defense Ministry in November 2023.

34. Interviews conducted within the Defense Ministry and SGMer in November 2023.

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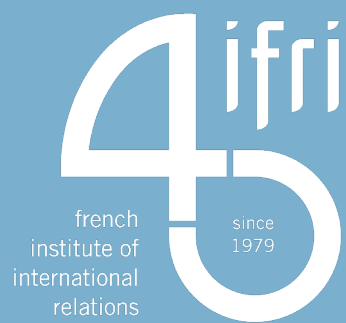
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