The Seafarer as an Actor in Maritime Domain Awareness

Protecting the Essential Human Sensor

COMMONWEALTH SECURITY & RESILIENCE GROUP

the seafarers' charity

01

Protecting the Essential Human Sensor

The International Maritime Organization defines Maritime Domain Awareness as the effective understanding of anything associated with the maritime domain that could impact security, safety, the economy, or the marine environment. That definition encompasses people and specifically the seafarers who crew the vessels, navigate the chokepoints, and move the cargo on which the global economy depends. Approximately 1.9 million of them are at sea at any given moment, carrying roughly 90 per cent of world trade across every ocean.

1.9M
SEAFARERS AT SEA
AT ANY GIVEN MOMENT

~90%
OF WORLD TRADE
CARRIED BY SEA

They are present where satellite coverage is partial, where shore-based systems do not reach, and where the most meaningful indicators of threat or emerging crisis are human rather than electronic. As advances in surveillance technology extend what automated systems can see and know, the seafarer represents the complementary human layer that no sensor can replicate.

But this relationship is not one-directional. MDA exists to protect people as much as to secure territory or trade. Behind every vessel tracked there are seafarers whose safety depends on that awareness being acted upon. Protecting the seafarer must be understood as both a driver for effective MDA and one of its primary purposes. Awareness is only meaningful when it results in protection on board and timely action ashore.

02

Technology and the Human Dimension: Complementary Capabilities

The IMO articulates MDA across three interdependent components: maritime situational awareness — knowing what is happening now; maritime threat awareness — assessing the risks those events present; and maritime response awareness — understanding what resources are available to act. Seafarers contribute meaningfully to all three. They generate situational data from locations and in conditions that automated systems cannot fully cover. They assess threat in context, drawing on experience and local knowledge that no algorithm holds. As the human actors closest to events at sea, they are frequently the first capable of responding. Seafarers do not simply add information to the picture; they often help determine whether the picture is accurate enough to guide a safe response.

Technological developments in maritime surveillance have accelerated over the past decade. Satellite-based vessel monitoring, the global rollout of the Automatic Identification System, unmanned platforms, and increasingly capable data analytics tools have extended the reach and resolution of what governments, navies, and coast guards can know about activity at sea. The seafarer represents a complementary layer of that capability, one that technology cannot replicate and should not be expected to. Thus, technology can strengthen the picture, but it is still the seafarer who may first notice when that picture no longer matches conditions on board.

The most effective MDA architectures will be those that combine technological reach with human judgement. A spoofed GPS signal corrupts the automated picture; a watchkeeper who senses the vessel is not where the instruments say it should be provides the correction. A data system surfaces an anomaly; a master with two decades of experience in these waters can say whether it matters. Engaging seafarers systematically as MDA contributors is the means by which the full value of technological investment can be realised. A system that supports seafarers in making safe decisions, and helps others to respond more quickly when something is wrong, is stronger than one that relies on technology alone.

For Commonwealth member states — forty-nine of the fifty-six of which are coastal or small island developing states — this complementarity has strategic value. Many operate across maritime spaces that are extensive relative to their monitoring capacity, and where the seafarer is often the most reliably present actor on the water. Integrating and fusing seafarer information into a composite picture should remain a priority. For seafarers, this should feel like a shared safety function, with clear and trusted ways to raise concerns when it matters.

03

The Seafarer's Contribution to MDA

The seafarers' contribution to MDA is best understood as part of everyday professional judgment at sea, rather than as an additional administrative burden.

01 **Contextual and behavioural knowledge**

Seafarers who work regularly in particular waters develop an acute sense of what is normal: the traffic patterns, vessel behaviour, the conduct of officials in the ports they frequent, and much else besides. Deviations from that normal are often recognised by experienced mariners well before they appear in data systems. A vessel loitering without obvious purpose, a rendezvous conducted off the shipping lane, cargo handled in a manner inconsistent with its declared nature, these observations arise from human familiarity with a place and its patterns, and represent core human intelligence. That kind of judgement comes from experience, routine, and familiarity with the waters, ports, and patterns that shape daily life at sea.

02 **Presence in contested and under-monitored spaces**

The maritime spaces that are most challenging to monitor technically are frequently the most consequential. Congested coastal waters, areas subject to electronic interference, poorly charted approaches, and regions where flag state oversight is limited are precisely the environments in which seafarers operate daily. GPS degradation, spoofing, and electronic warfare have demonstrated that automated systems can be deceived or blinded in these spaces. The seafarer, operating in the same conditions, remains a reliable and independent source of observation. In fact, in exposed or poorly monitored waters, the seafarer may be the most reliable observer available, especially when technology is degraded or uncertain.

03 **Early indicators of emerging threats**

Piracy, drug trafficking, illegal fishing, vessels in distress, and the movement of sanctioned cargoes have each, in documented cases, been first observed by seafarers. Structured mechanisms to capture those observations and route them to the relevant authorities would convert an existing but largely informal intelligence contribution into a systematic and actionable one.

04 **Trusted reporting at sea**

Seafarers are more likely to share sensitive information when the reporting route is simple, trusted, and clearly linked to protection. If speaking up is seen as risky, burdensome, or unlikely to lead to help, important information may never leave the vessel. A trusted route for reporting is therefore part of effective MDA, because it helps ensure that concerns raised at sea can lead to timely action ashore.

04

MDA as a Tool for Seafarer Protection

Maritime Domain Awareness is most commonly discussed as a means of securing national interests: protecting exclusive economic zones, detecting illicit activity, and maintaining freedom of navigation. These are legitimate and important purposes. But MDA is also a competence for understanding what is happening to people at sea.

When MDA systems identified vessels at anchor in the Arabian Gulf following the closure of the Strait of Hormuz, what they were tracking was not only a shipping disruption, they were locating an estimated 20,000 people stranded without clear legal protection or recourse. When coastal state authorities receive distress signals or observe vessels behaving erratically, effective MDA is what determines how quickly help can reach those aboard. When a vessel goes dark — disabling its AIS transponder or falling victim to electronic interference — the seafarers on board become invisible to systems designed to protect them.

The question must also be asked: how well does our current MDA capability identify and respond to seafarers at risk? How quickly can it locate a vessel in distress in a poorly monitored stretch of water? How effectively does it detect the coercion, abandonment, or endangerment of crews who cannot or will not broadcast their situation openly?

Answering those questions requires the human layer that technology alone cannot provide. A seafarer who can safely report that their vessel is operating under duress, that crew members are being held against their will, or that conditions aboard present an imminent safety risk is providing MDA with the kind of ground-truth intelligence that closes the gap between what automated systems show and what is actually happening at sea.

05

The Risk Environment

Enabling seafarers to contribute meaningfully to MDA — and to benefit from it — requires a recognition of the threats they face. The multilateral frameworks governing maritime security and seafarer protection have developed significantly in recent years, but implementation remains uneven, and in several areas the pace of emerging threats has outrun the protections available. For seafarers, these risks are not separate categories; they are overlapping pressures that can affect safety, wellbeing, decision-making, and resilience on board.

Geopolitical exposure

Geopolitical competition is increasingly expressed through the maritime domain, and seafarers are among its most exposed participants. The closure of the Strait of Hormuz following the US/Israel – Iran war left an estimated 20,000 sailors effectively stranded in the Gulf, often in appalling conditions. Houthi attacks in the Red Sea, tensions in the South China Sea, and the use of merchant shipping as an instrument of state pressure point to growing uncertainty in maritime chokepoints, and a consequent growth in geopolitically associated seafarer risk.

Cyber threats to safety and data integrity

IMO Resolution MSC.428(98), adopted in 2017, requires cyber risk management to be integrated into vessel safety management systems, recognition at the highest regulatory level that digital vulnerability is now essential for both maritime safety and security. The updated Guidelines on Maritime Cyber Risk Management (MSC-FAL.1/Circ.3 Rev.3, April 2025) extend this framework across bridge navigation, propulsion, and cargo management systems, and emphasise that effective cyber risk management must reach into all levels of an organisation - including the crew. In practice, GPS spoofing in the Red Sea and Black Sea has caused vessels to navigate on false positional data, corrupting the very picture that MDA depends upon. Ransomware targeting ship and port systems is growing in frequency. Cyber-enabled manipulation of cargo documentation has been used by criminal networks to implicate crews in contraband they knew nothing about. Seafarers who understand these threats are better placed both to protect themselves and to recognise when the data environment around them has been compromised - which is itself actionable MDA intelligence. On board, cyber risk is not only a technical issue; it is also a safety issue because crews must continue making sound decisions when systems become uncertain.

Crew abandonment and economic precarity

The joint IMO/ILO database records a sharp and sustained rise in crew abandonment cases: from fewer than 20 reported annually between 2011 and 2016, to 114 cases by mid-December 2022. Behind those numbers are seafarers stranded in foreign ports without wages, provisions, or the means to return home, often while operators pursue insolvency or seek to evade liability across jurisdictions. For those seafarers, abandonment means hardship in the most immediate sense: uncertainty, financial strain, restricted options, and growing concern for family and the future.

Wrongful criminalisation

The wrongful criminalisation of seafarers, detained and prosecuted in foreign jurisdictions for incidents in which they bear no culpable responsibility is a documented and persistent problem with direct MDA consequences. IMO's Legal Committee maintains a standing agenda item on the fair treatment of seafarers, and the April 2025 Fifth Special Tripartite Committee agreed to establish a joint ILO-IMO working group specifically to address the issue, reflecting renewed urgency across the international community. When crews fear that honest reporting will lead to arrest or prolonged legal proceedings far from home, the incentive to report is suppressed. Legal frameworks that protect seafarers who report in good faith are structural enablers of better domain awareness. Building effective MDA requires building trust, and trust requires protection.

Voices from around the Commonwealth

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The sea is a way of life for the Caribbean. We benefit from the fruits of the sea and we recognise the value that seafarers bring to our economy. When the Trinidad and Tobago coastguard prepared its strategic plan we established a series of what ifs and contingency plans to address the safety of life at sea. We are always cognisant of the threats to seafarers — our efforts on awareness must be calibrated accordingly.

Commodore Don Polo
CHIEF OF THE DEFENCE STAFF · TRINIDAD AND TOBAGO

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Human intelligence remains the most important form of data collection. I am not anti-technology, but ultimately, we always link back to the verification of humans. This has taken even greater prominence with the advent of social media — everybody is now a reporter. We find out things from social media before agencies or investigators even turn up on the scene. Information from land based or aerial assets are essential for maritime awareness, but I will always maintain, human intelligence, including the layering in of social media, is the most important source of information we have.

Tonya Ayow
DEPUTY EXECUTIVE DIRECTOR · CARICOM IMPACS

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Effective MDA depends on the partnership between advanced technology and well trained seafarers. By strengthening seafarer welfare, regulatory compliance, and inter-agency collaboration, The Gambia can enhance maritime safety, security, environmental protection and the sustainable management of its maritime domain.

Olimatou Danso-Malang
DIRECTOR GENERAL · GAMBIA MARITIME ADMINISTRATION

06

The Commonwealth Opportunity

The Commonwealth is well placed to advance MDA capability building in support of national security, economic stability, environmental protection, and seafarer welfare. Its 56 member states share legal traditions and a common working language. 49 are coastal or island nations with direct and often vital maritime interests. Successive Heads of Government Meetings have called for deeper maritime security cooperation, and the Commonwealth is uniquely positioned to translate that political commitment into practical, member state-level action particularly for small island developing states and developing coastal nations whose maritime exposure is acute and whose voice in shaping global maritime security norms has not always been commensurate with their stake in the outcome.

The existing multilateral architecture the IMO frameworks, the joint ILO/IMO working mechanisms, the evolving international consensus on cyber risk and seafarer protection — provides the foundation. What Commonwealth cooperation can add is the political will, the shared institutional trust, and the practical focus to turn those frameworks into consistent action. The two recommendations that follow are grounded in existing capacity, designed to complement and build upon current technological investment, and focused on affirming the seafarer as a contributor, an actor, and as a person deserving of protection. Read in that way, the recommendations below are as much about strengthening protection and resilience as they are about strengthening awareness.

Recommendations

01

Establish a Commonwealth Seafarer Reporting Protocol for MDA

Nodes of cooperation across Commonwealth member states, should develop a standardised, accessible, and legally protected reporting protocol enabling seafarers to contribute MDA-relevant observations through clear channels – supporting the already outstanding work of the information fusion centres. The reporting route should be simple, trusted, and designed so that seafarers can raise concerns without fear of retaliation or being ignored.

02

Train Seafarers as MDA Contributors and Build Resilience Against Emerging Threats

A Commonwealth-wide training framework should equip seafarers to understand MDA, to recognise and report observations of maritime security relevance, and to protect themselves against the growing range threats they face, including in the digital realm. Grounded in the IMO's Guidelines on Maritime Cyber Risk Management (MSC-FAL.1/Circ.3 Rev.3) and Resolution MSC.428(98), the framework should translate those technical standards into practical shipboard knowledge, covering GPS spoofing, malware targeting vessel management systems, and the manipulation of electronic cargo documentation. Training should reflect shipboard realities and support seafarers to recognise risk, protect themselves, and contribute confidently to awareness and response.

ABOUT THE AUTHORS

COMMONWEALTH SECURITY & RESILIENCE GROUP

The Commonwealth Security & Resilience Group fosters security cooperation, promotes dialogue and works with government, business and civil society to strengthen resilience to current and emerging challenges across the Commonwealth. CWSRG is the Commonwealth's formal security institution, accredited by member states to inform and understand decision-making and policy; to build new partnerships; and to promote leadership and expertise from across the wider Commonwealth community. The Group is mandated to energise networks throughout the Commonwealth to enhance the security and resilience of member states, and the organisations and communities within them.

the seafarers' charity

The Seafarers' Charity has been improving the lives of those who work at sea, and their families, for over 100 years. Established in 1917 as The King George's Fund for Sailors, to support the families of seafarers lost at sea during World War One, we support seafarers throughout their seafaring careers and beyond. We are the largest independent grant funder of maritime welfare charities – with at least £2m in funding injected into supporting the safety and welfare of seafarers every year.

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