SOVEREIGN MARITIME INTELLIGENCE

Maritime Monitoring: Time to Detect the Invisible

The ocean economy is worth $1.5 trillion a year and carries 80% of global trade by volume. The system the world uses to watch it was never built for adversaries. This is the case for a new one.

AUTHOR
Leo Pauly

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00 — ABSTRACT

The ocean is the world's most important blind spot.

Our oceans are a critical medium supporting the global economy. Over 80% of international goods by volume and 70% by value are transported via sea. The ocean economy is worth $1.5 trillion annually — projected to reach $3 trillion by 2030 — employs over 30 million people and supports nearly 3 billion livelihoods. The oceans span approximately 361 million square kilometres, covering 70% of Earth's surface.

$1.5T	80%	25%	361M
annual value of the ocean economy	of global goods by volume travel by sea	of fishing activity is visible through AIS	km² of ocean — 70% of Earth's surface

The current method for real-time monitoring of maritime activities on a global scale relies heavily on the **Automatic Identification System (AIS)**. This radio-based communication tool enables vessels to automatically transmit and receive key data such as identity, location, speed and direction. However, AIS is susceptible to manipulation — including spoofing and deactivation — and in many cases does not exist at all, rendering such ships **dark vessels**. Recent studies show that only 25% of global fishing activity is visible through AIS. Incidents at offshore facilities, like fires or explosions, remain undetected entirely. As a result, a significant portion of critical maritime activity is monitored too late or never seen at all — causing economic losses for the maritime industry and for governments.

> Due to the vastness of the oceans, we currently lack any real-time maritime monitoring capability at global scale beyond AIS.

This white paper makes the case for a novel, advanced mechanism to monitor our oceans globally in real-time — to plug the massive gaps in the current system. It will let us shift from today's reactive posture to a preemptive one, where maritime incidents can be predicted before they occur.

01 — WHY IT IS NEEDED

The economic case for an advanced maritime monitoring system.

The following case studies highlight the economic need for an advanced maritime monitoring system, industry by industry.

01

Piracy

- Maritime piracy imposes substantial economic burdens — ransom payments, loss of cargo, damage to vessels, harm to crew, higher security costs and insurance premiums. Rerouting to avoid piracy-prone regions adds transit time, fuel expense and supply-chain disruption.
- By some estimates, piracy costs the global economy around **$25 billion annually**. On March 12, 2024, Somali pirates hijacked the cargo ship MV Abdullah in the Indian Ocean, holding 23 crew hostage and releasing them only after a $5 million ransom.
- Beyond shipping, piracy hits offshore infrastructure such as oil and gas plants — petroleum products and equipment stolen in incidents often called **petro-piracy**, with significant losses reported in recent years.
- An advanced system provides on-time piracy alerts with improved maritime domain awareness at global scale, and helps governments curb piracy by delivering timely intelligence on pirate activity.

02

Dark-fleet collision risks

- Dark vessels are increasingly used to move sanctioned cargo such as crude oil. This **dark / shadow / ghost fleet** is estimated at **600 to 1,400 vessels** — roughly a fifth of the global crude tanker fleet — and most are considered too old for normal maritime standards. By mid-2025, ageing vessels are projected to account for 11% of global tanker demand.
- Older, poorly maintained vessels sharply raise accident risk. Because dark vessels deactivate AIS, they are invisible not only to authorities but to nearby ships — raising the risk of collision and damage.
- Dark-fleet vessels lack sufficient insurance, so repair and clean-up costs after an accident fall on the legally operated vessel — or, where only dark vessels are involved, on the taxpayers of the controlling coastal state.
- Over **50 maritime accidents** involving dark-fleet vessels were reported globally in 2023–2024, and the number is expected to grow.

$25bn	estimated annual cost of maritime piracy
600–1.4k	vessels in the global dark fleet
50+	dark-fleet accidents in 2023–2024

03

Market intelligence for investment firms

- Real-time vessel tracking reveals shifts in shipping patterns and trade flows — congestion on a busy route can signal economic activity ahead of the market. But AIS has grown unreliable as **spoofing** spreads, transmitting fake identity and location to conceal cargo. It is increasingly necessary to look beyond AIS to see actual maritime economic activity.
- Combining shipping patterns with cargo classification enables faster supply-chain analysis and helps predict prices and demand for commodities such as crude oil or grain. Rising pirate activity — invisible to AIS-based monitoring — can directly move the price of commodities on a route.
- Detecting dark-fleet vessels and their suspicious patterns can surface hidden transactions such as illegal **Ship-to-Ship (STS) transfers**, revealing hidden commodity flows of real value to investors.
- Real-time evaluation of leasing rates, vessel utilisation and fleet properties informs maritime-related equities and bonds — letting firms capitalise on trends, mitigate risk and identify opportunities across global markets.

04

Maritime insurance

- As AIS spoofing spreads, insurers need more reliable ways to monitor covered ships. A NYTimes investigation uncovered numerous vessels falsifying locations while still insured by U.S. underwriters. Catching this promptly prevents fraudulent claims and avoids complacency toward illegal activity that risks government action.
- Looking beyond AIS enables **live threat analysis**: insurers can assess when risk changes in real-time and dynamically apply higher coverage and premiums — for example, when a vessel reroutes into waters with recent pirate activity after disabling AIS.
- Insurers can also pass live threat intelligence to policyholders, improving safety and reducing claims. With an estimated **$40 billion** paid annually in premiums, even a fractional reduction in claims saves millions — an alternative to premium hikes already announced at 5–10% for 2025–2026.

05

Coastal security of Exclusive Economic Zones

- An estimated **1 in 5 fish** is caught illegally. Illegal, Unregulated and Unreported (IUU) fishing costs the global economy an estimated **$26–50 billion a year**, with governments losing billions in unpaid taxes, tariffs and license fees — tax revenue loss alone is put at $2–4 billion annually.
- Madagascar incurs an estimated $80 million in annual losses; Argentina loses roughly $2 billion each year to IUU fishing — a significant challenge for governments worldwide.
- The sheer size of an EEZ and the use of dark vessels make illegal fishing hard to patrol and apprehend. Indonesia has around **72 coastguard ships** to oversee roughly 6 million km² — more than double the Mediterranean — while losing around $4 billion annually to IUU fishing.
- Beyond direct losses, uncontrolled exploitation depletes resources, threatening future economic opportunity and food security. Monitoring coastal waters is also essential to prevent drug and human trafficking and contraband smuggling.
- Gaps persist despite heavy coastguard spending, because the area is so vast. The UK's EEZ is around **6.81 million km² — about 28× its land area**.
- Large-EEZ nations struggle to cover their waters: the U.S. (11.35M km², ~1.2× land), Australia (~8.51M km², ~1.1×) and France (11.69M km², ~21×). For some small states the ratio is astronomical — **Kiribati ~4,200×** and the Marshall Islands ~11,000×.

06

Environmental protection

- In May 2023 the ageing tanker **Pablo** (built 1997) exploded off the coast of Malaysia. The resulting oil spill potentially reached Indonesian shores — yet investigations revealed little to no information about its owners and no trace of insurance, so no entity could be held accountable for the clean-up.
- As the number of ageing, uninsured dark vessels rises, such incidents will grow — with severe and unprecedented environmental consequences globally.

07

Defence

- **Maritime Domain Awareness (MDA)** is vital for national defence and security. Effective monitoring of territorial waters and timely identification of bad actors enables a proactive threat response.
- Monitoring gaps in territorial waters can be exploited by non-state actors to launch attacks and cause instability. In the 2008 Mumbai attack, the attackers entered via the sea route — underscoring the need for constant monitoring. Advanced MDA is also vital against maritime grey-zone aggression, espionage and amphibious threats.
- Because the vessels involved take extensive measures to stay undetected, more advanced systems are required to detect anomalous vessels at broad scale and provide timely alerts.

> Seven industries, one gap: no system delivers persistent maritime intelligence at ocean scale.

02 — MARKETS

Markets and use-cases at a glance.

Advanced maritime intelligence — in real-time, at global scale — across industries.

INDUSTRY	USE-CASES OF ADVANCED MARITIME MONITORING
Shipping companies & agencies	**Vessel security & cargo protection** — piracy alerts, dark-vessel collision alerts. **Fleet monitoring & management** — real-time maritime domain awareness.
Fishing cooperatives	Vessel security; illegal-fishing activity monitoring; fleet monitoring & management; ensuring compliance with maritime regulations.
Offshore energy companies OIL & GAS · WIND OPERATORS	Off-shore asset & infrastructure security — unauthorised-vessel activity alerts; supply-chain protection to and from the offshore facility.
Maritime insurance	Dynamic risk & liability estimation; claim verification and fraud detection; monitoring vessels to ensure regulatory compliance.
Investment firms	Real-time insight into maritime economic activity; market intelligence on transported commodities; instant knowledge of supply-chain disruptions.
Government & civil agencies	Safeguarding the EEZ; monitoring IUU fishing; law enforcement — drug & human trafficking, smuggling prevention; marine environment & biodiversity protection; search and rescue.
Defence	Border security; maritime domain awareness; maritime asset & infrastructure protection; proactive threat response.

03 — THE ALTERNATIVES

The limits of today's monitoring beyond AIS.

Current maritime monitoring beyond AIS falls into two categories — and both fall short.

(A) REGION-BASED

Radar, patrols, drones & aircraft

Land- and vessel-based radar, coastal patrol vessels, aerial drones and surveillance aircraft lack long-range coverage and, against the sheer size of the oceans, sufficient visibility. They are also costly — anti-piracy measures run **$212,000–$610,000** per voyage per ship; the Indian Coast Guard's 2024–25 budget is around **$900 million**.

(B) SATELLITE IMAGERY

Broad coverage, delivered too late

Imagery offers broad coverage but is typically on-demand and requires pre-tasking — you must already know where an incident is. Procurement takes hours to days, reducing the insight to a historical record. Actionable intelligence must arrive **within seconds**, in concise form.

04 — OUR VISION

An advanced maritime monitoring system.

We are building a constellation of Low Earth Orbit **AI-CubeSats** to monitor the oceans continuously. Each satellite carries high-resolution, typically centimetre-scale multispectral sensors and onboard **Edge-AI** to image the ocean, identify and classify vessels — regardless of AIS status — directly onboard, and transmit only the relevant data to Earth in near real-time. In future, we will uplink more advanced Edge-AI models to satellites already in orbit, expanding what the fleet can detect — from any floating object or infrastructure to its status, such as a fire on an offshore rig.

This system does not replace AIS or region-based monitoring. It bridges the critical capability gap in maritime domain awareness — enabling the shift from a reactive posture to a proactive one, and delivering truly comprehensive maritime monitoring.

PLASMA GEOSPATIAL LTD · UNITED KINGDOM
HELLO@PLASMAORBITAL.COM