Unseenlabs Reveals Hidden Activity
in the West Philippine Sea:

Case of Chinese Coast Guard Vessel Near Spratly Islands

Illustrative photo

Summary

# RF intelligence cuts through contested waters, making China's presence more visible.

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In the West Philippine Sea—the portion of the South China Sea adjacent to the Philippines and within the Philippines' Exclusive Economic Zone (EEZ)—Chinese Coast Guard (CCG) units and maritime militia maintain a persistent posture around disputed features near the Spratly Islands and Scarborough Shoal. Merchant shipping intersects with industrial and small-scale fishing, while law-enforcement and naval patrols operate in tight proximity. In this crowded theater, cooperative signals can be inconsistent, and visibility is frequently shaped by gray-zone tactics rather than transparency.

To cut through that uncertainty, Unseenlabs observed the same area of interest twice, several months apart, using the same space-based RF methods to create comparable views over time and distinguish routine movement from behavior of interest. Within this period, we also followed a prominent CCG vessel operating not far from the Spratlys; when its AIS[1] went silent, our space-based RF intelligence[2] and fingerprinting maintained continuity and kept the track alive.

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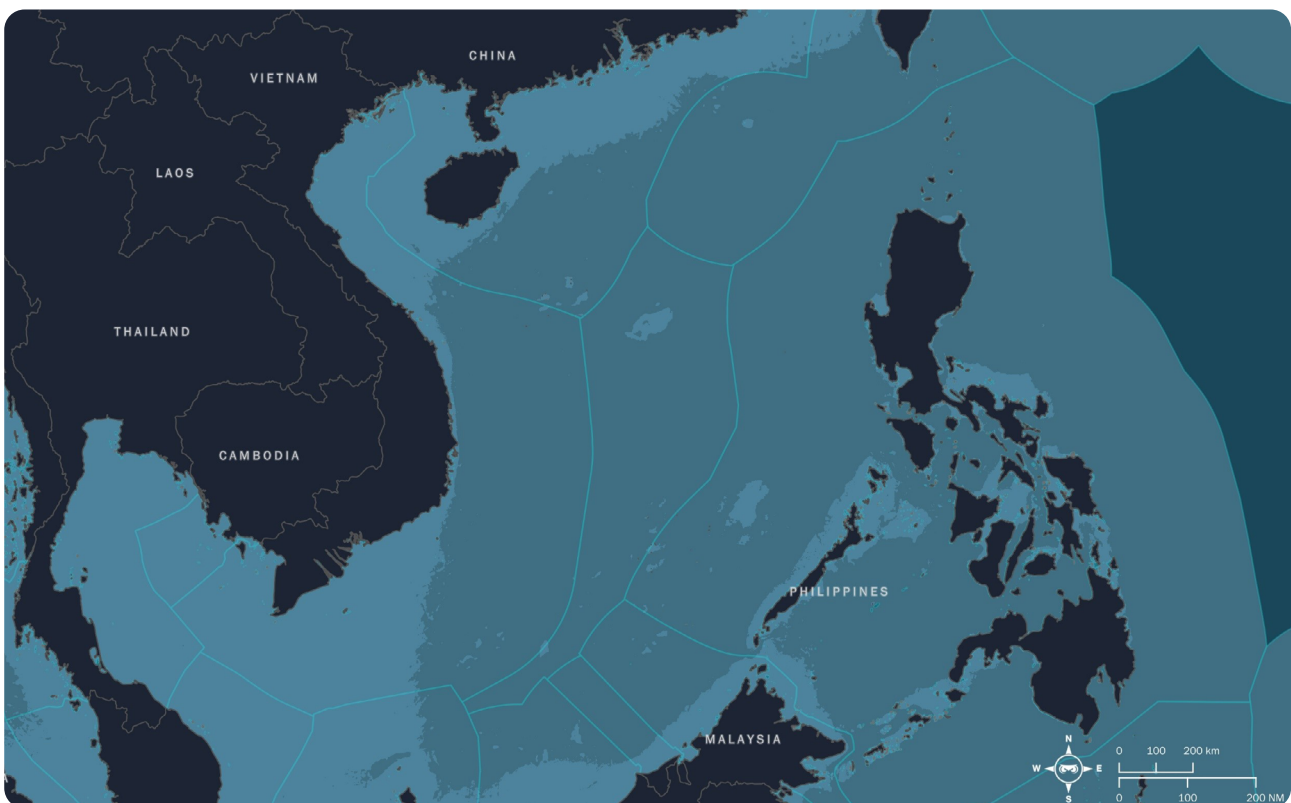
[1] A cooperative tracking system that broadcasts a vessel's identity, position, course, and speed via radio signals. Mandatory for most commercial ships, AIS improves safety and traffic management but can be turned off, spoofed, or manipulated—making it unreliable as a sole source of maritime awareness.

[2] The use of satellites to capture and analyze radio frequency (RF) emissions from vessels and other emitters at sea. Unlike AIS, RF detection is non-cooperative: it identifies signals that ships cannot mask or falsify. By geolocating these emissions, space-based RF intelligence provides independent visibility of maritime activity, even when ships attempt to remain hidden.

Why this sea is so sensitive and strategic

The West Philippine Sea is part of the wider South China Sea, a semi-enclosed body of water bordered by the People's Republic of China (PRC), Taiwan, the Philippines, Malaysia, Brunei, Indonesia, and Vietnam. Its importance cannot be overstated. One-third of global maritime commerce flows through these waters, while fisheries and coral reefs sustain millions of livelihoods. Yet this same sea is fractured by overlapping sovereignty claims, strategic rivalries, and ecological decline.

Even its name reflects these disputes: South China Sea, West Philippine Sea, East Sea, and North Natuna Sea are used by different states to assert their narratives of ownership and control.

One sea, multiple names shaped by sovereignty claims

South China Sea, East Sea,
West Philippine Sea or North Natuna Sea

The PRC anchors its expansive claim to the nine-dash line[3], which sweeps across the EEZs of its neighbors. Despite the 2016 ruling by the Permanent Court of Arbitration rejecting these claims as incompatible with international law, Beijing has accelerated its consolidation of power on the water. Artificial islands at Mischief Reef, Fiery Cross Reef, and Subi Reef are now bristling with runways, radar arrays, missile systems, and combat aircraft. This militarization has altered the balance of power in the region and given the PRC fixed outposts to project authority deep into disputed waters.

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[3] The nine-dash line is a boundary used by both the People's Republic of China and, historically, Taiwan to assert sweeping claims over much of the South China Sea. It appears as a series of dashes on official maps and encompasses key disputed features, including the Paracel Islands, the Spratly Islands, the Pratas Islands and Vereker Banks, the Macclesfield Bank, and Scarborough Shoal. These claims overlap with the Exclusive Economic Zones of several neighboring states and remain a central source of tension in the region.

Illustrative photo

At sea, the PRC deploys its coast guard and maritime militia as instruments of law enforcement and sovereignty. Their methods include swarming foreign vessels, using water cannons, or ramming ships — actions designed to deter rivals without crossing into open conflict. These gray-zone tactics exploit ambiguity, applying constant pressure without triggering a formal military response. For the Philippines, whose EEZ lies at the heart of these tensions, the challenge is urgent: how to safeguard sovereignty and livelihoods without being drawn into escalation.

The stakes extend beyond Manila. The U.S.–Philippines alliance has been revitalized through the Enhanced Defense Cooperation Agreement, which has expanded U.S. access to Philippine bases. American deployments now include systems like Tomahawk and Typhon missiles, signaling Washington's intent to deter Beijing and reassure regional allies. In parallel, defense spending is rising across the Indo-Pacific, with Japan, South Korea, and Australia expanding their military reach.
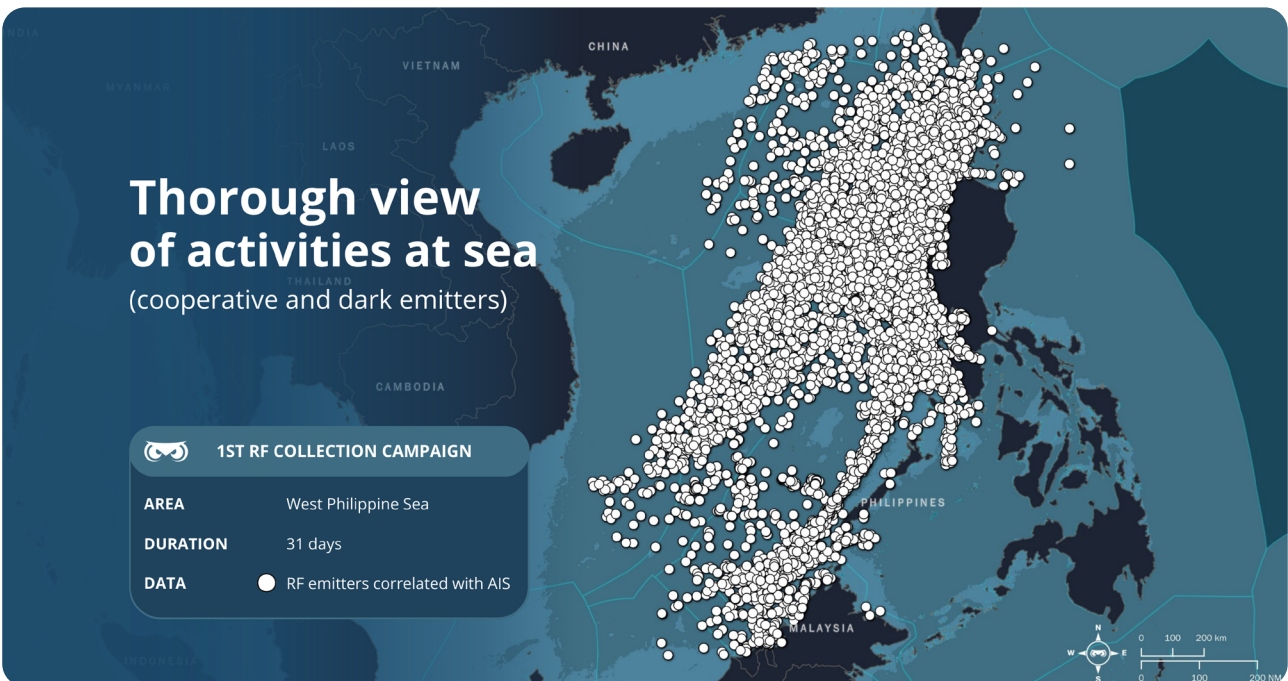
Some analysts warn that the Philippines risks becoming the "Ukraine of Asia"[4]: a frontline state where a smaller power's sovereignty challenge could escalate into a broader confrontation between major powers. While that outcome is not inevitable, the risks of miscalculation are real. Escalation would not only threaten maritime security but could trigger humanitarian crises, displacement, and severe disruption of global trade routes.

In this contested and unstable environment, independent visibility is no longer optional. It is the foundation for resilience, deterrence, and informed decision-making at sea.
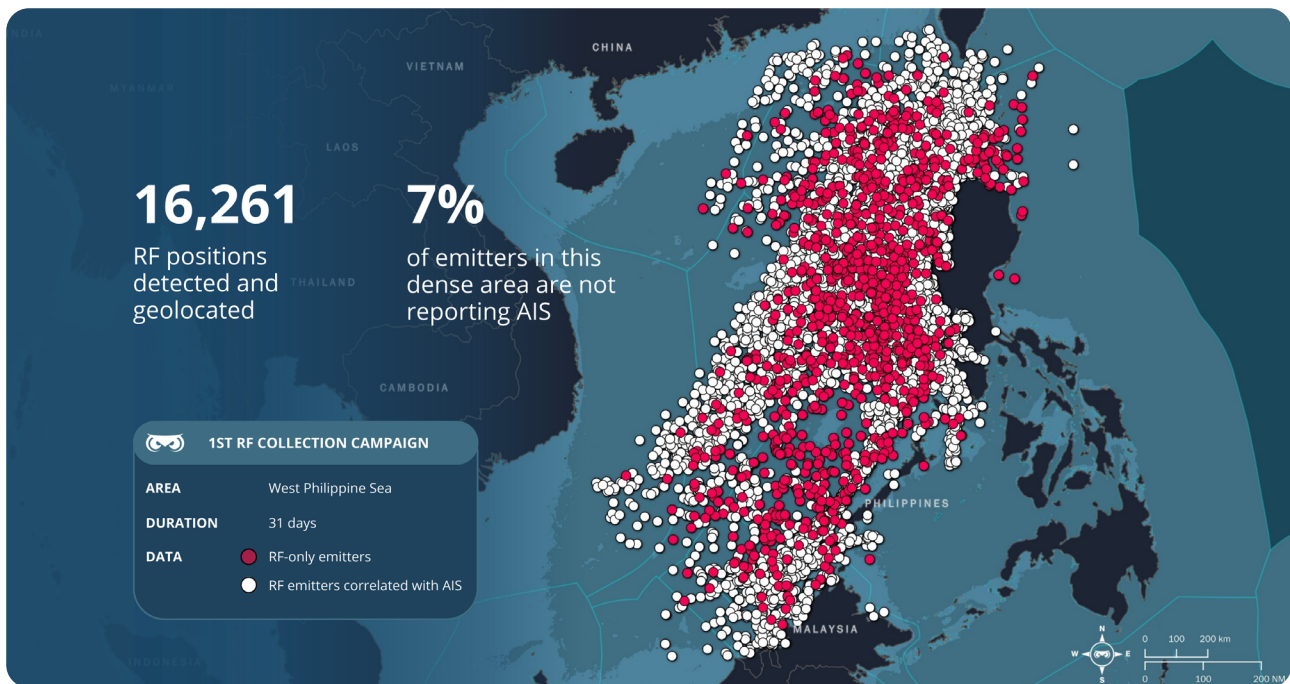
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[4] Can the Philippines become the 'Ukraine of Asia?' – Asia News Network

Monitoring the West Philippine Sea in Two Acts

Cumulated coverage
of 80 RF data collections
≃ 300,000 km2 for each collection

1ST RF COLLECTION CAMPAIGN

AREA	West Philippine Sea
DURATION	31 days
DATA	RF coverage

Thorough view
of activities at sea
(cooperative and dark emitters)

1ST RF COLLECTION CAMPAIGN

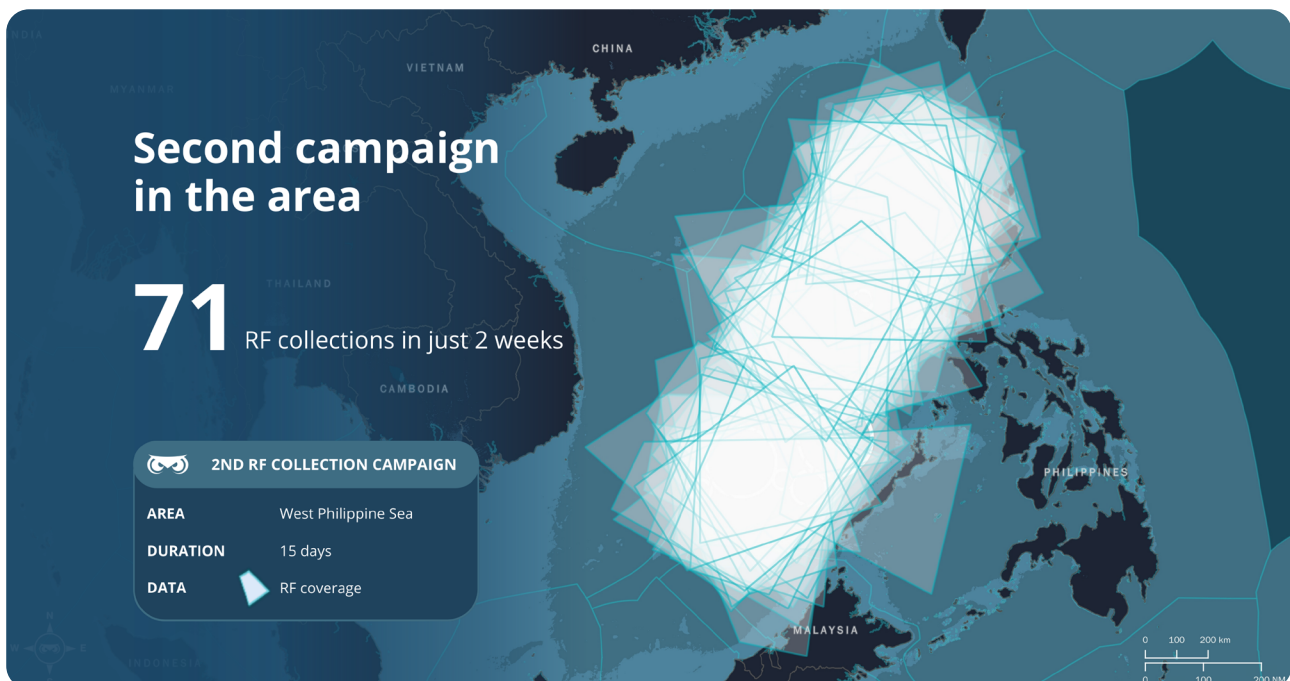| AREA | West Philippine Sea |
| DURATION | 31 days |
| DATA | RF emitters correlated with AIS |

The first campaign lasted 31 days. During this period, Unseenlabs conducted 80 collections, with 3 to 4 revisits every day. Each collection covered an average footprint of about 300,000 square kilometers. In total, 16,261 RF positions were detected and geolocated.

16,261
RF positions detected and geolocated

7%
of emitters in this dense area are not reporting AIS

1ST RF COLLECTION CAMPAIGN

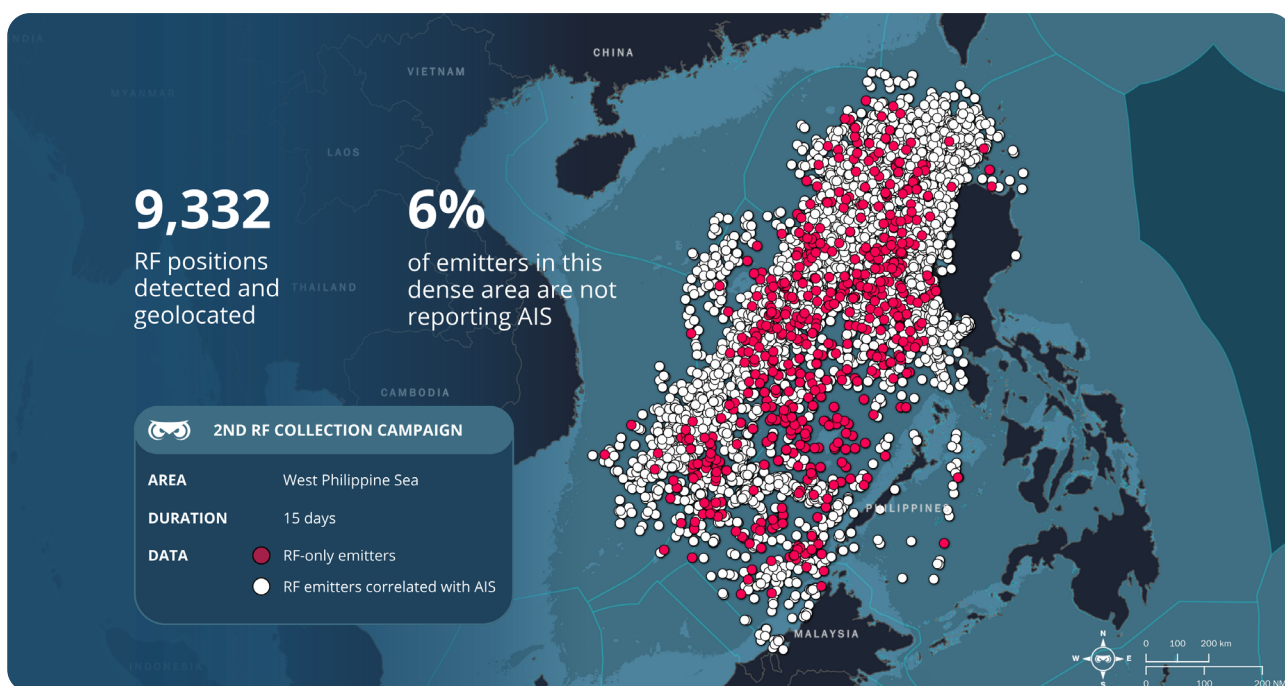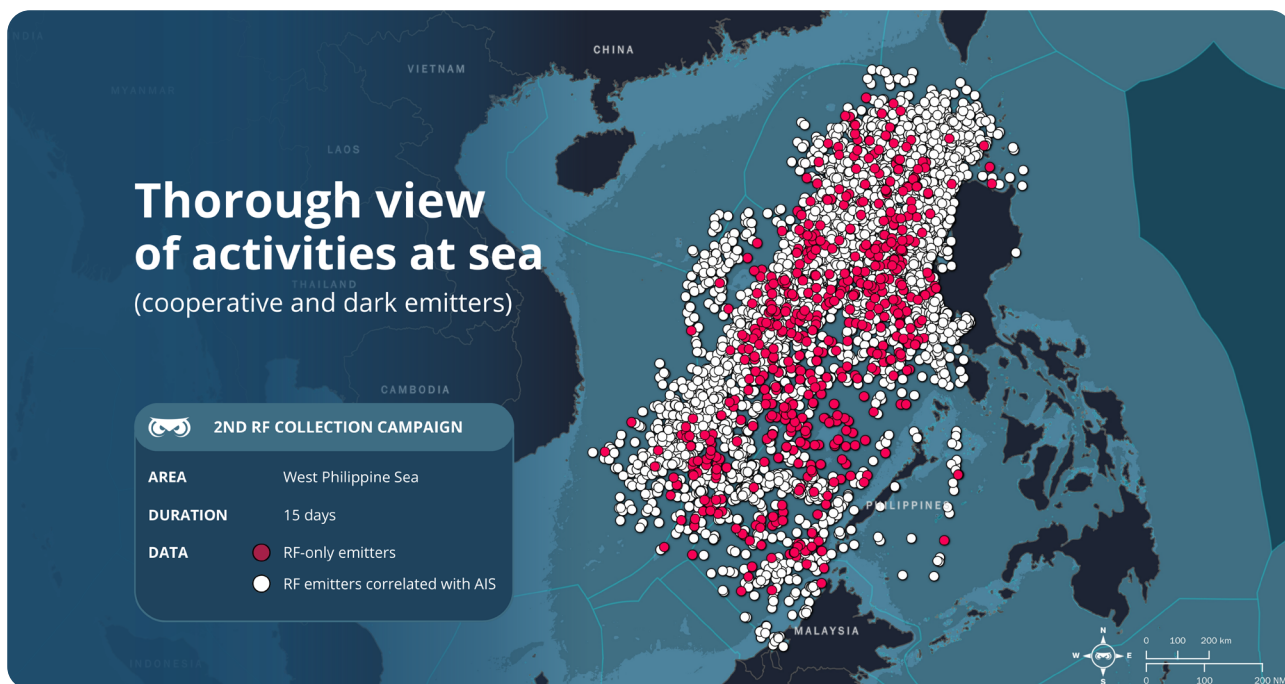|	
AREA	West Philippine Sea
DURATION	31 days
DATA	● RF-only emitters
	○ RF emitters correlated with AIS

7% of the emitters identified during this campaign had no corresponding AIS signal, confirming the presence of vessels operating in the area without cooperative reporting.

Second Campaign

Second campaign in the area

71 RF collections in just 2 weeks

2ND RF COLLECTION CAMPAIGN

AREA	West Philippine Sea
DURATION	15 days
DATA	RF coverage

Three months later, a second campaign was carried out over the same area, this time for 15 days. 71 collections were performed with the same revisit tempo of 3 to 4 passes per day. This second effort resulted in 9,332 RF positions detected and geolocated. 6% of the emitters observed during this campaign were not correlated with AIS.

Thorough view of activities at sea
(cooperative and dark emitters)

2ND RF COLLECTION CAMPAIGN

AREA	West Philippine Sea
DURATION	15 days
DATA	● RF-only emitters
	○ RF emitters correlated with AIS

9,332
RF positions detected and geolocated

6%
of emitters in this dense area are not reporting AIS

2ND RF COLLECTION CAMPAIGN

AREA	West Philippine Sea
DURATION	15 days
DATA	● RF-only emitters
	○ RF emitters correlated with AIS

Taken together, these two campaigns provide more than isolated snapshots of maritime activity; they form a baseline for understanding behavior over time. By running the same tasking in the same area at different points, analysts can confirm whether unusual signals are isolated anomalies or recurring patterns. This makes it possible to identify locations where non-reporting behavior is persistent, even in dense traffic.

Repetition also reduces ambiguity by filtering out transient factors such as weather-driven variations in ship traffic, seasonal patterns, or short-lived operational surges. What remains visible across both campaigns is far more likely to reflect deliberate patterns of activity. This strengthens the ability to refine tasking, whether by focusing collections on areas of recurring interest, adjusting revisit cadence, or triaging signals more effectively for analysis.
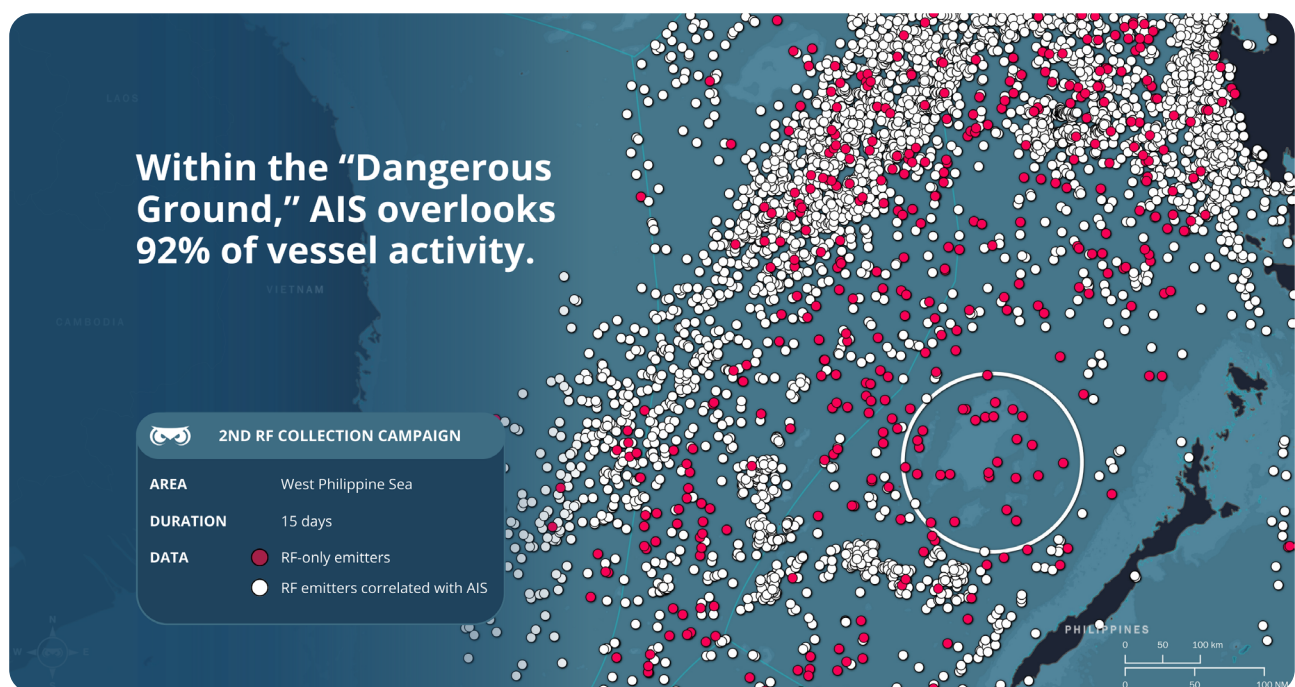
Finally, repeated coverage supports decision-making by giving clients evidence across time rather than at a single moment. This enables better risk assessment, more confident de-confliction, and sharper planning for enforcement or patrol missions.

In short, repeating campaigns does not simply increase the volume of data. It increases certainty. It transforms observation into insight and helps turn signals into stronger decisions.

Revealing What Lies Within the "Dangerous Ground"

Between the Spratly Islands and surrounding shoals lies a maritime expanse known as the "Dangerous Ground." This central sector of the South China Sea is notorious for its poor navigational conditions. It contains numerous reefs, shoals, sandbanks, and low islands, many of which are unsurveyed or inaccurately charted. Hydrographic data remain incomplete, and positions of hazards are often uncertain, with some features reported several miles away from their charted locations. Ships are advised to exercise extreme caution in these waters, where currents, shifting seabed, and limited visibility further increase the risks of navigation.

But the "Dangerous Ground" is not only hazardous to ships because of its geography. It is also a zone of geopolitical contestation. Rival sovereignty claims converge here, and vessels ranging from fishing fleets to maritime militia and coast guards operate in close proximity. This makes it both a physical and an informational void: a place where navigation is treacherous and where deliberate opacity in maritime behavior is common.

Within the "Dangerous Ground," AIS overlooks 92% of vessel activity.

2ND RF COLLECTION CAMPAIGN

AREA	West Philippine Sea
DURATION	15 days
DATA	RF-only emitters
	RF emitters correlated with AIS

Unseenlabs' second RF collection campaign underscored the extent of this opacity. Over 15 days of monitoring, AIS missed 92% of vessel activity in the "Dangerous Ground." Independent RF intelligence filled this gap by maintaining continuity and exposing the full scope of traffic, including vessels that would otherwise remain unseen.

In contested waters such as the "Dangerous Ground," RF detection replaces uncertainty with reliable insight, delivering a verifiable picture of maritime activity for informed decision-making.

Tracking of a Chinese Coast Guard Vessel Near the Spratlys

During the first campaign, a notable CCG vessel operating not far from the Spratly Islands became a subject of interest. At one point in its patrol, the vessel's AIS track ceased for approximately forty-five minutes. Unseenlabs continued to receive uncooperative RF emissions during that interval.

Because our analysts study stable and repeatable signal features, we attribute to each vessel its unique RF fingerprint. That fingerprint, combined with correlation methods, allows us to maintain continuity even when routes are irregular or when cooperative transmissions stop. In this case, the fingerprint enabled continuous monitoring through the AIS gap and back into normal reporting, preserving a clear picture of the vessel's movement across a sensitive area.

Using RF fingerprints and correlation, we monitor ships reliably, even when their routes are irregular.
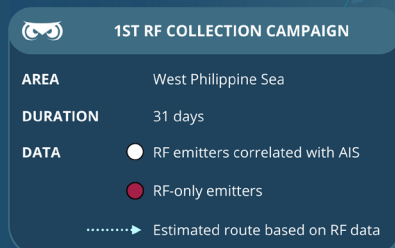
Open-source reporting has repeatedly described sustained CCG presence around disputed features in the South China Sea. While we anonymize the specific identity here, the behavior we observed—persistent patrols, intermittent gaps in AIS, and movements consistent with sovereignty enforcement—aligns with that broader operational pattern.

Breaking Down Unseenlabs' Monosatellite Technology

In the world of space-based RF detection, most systems depend on triangulation. Multiple satellites must capture the same signal, compare their measurements, and only then calculate a position. While effective, this process takes time, adds complexity, and requires constant coordination across an entire constellation.

At Unseenlabs, we chose a different path. Our proprietary monosatellite technology allows us to detect, analyze, and geolocate a signal from a single satellite pass, no triangulation required.

This innovation creates several decisive advantages:

• **Speed:** Since geolocation is achieved with a single satellite, detections happen faster. There is no waiting for additional satellites to align.

• **Reliability:** With fewer variables in play, our system reduces complexity and points of failure. Each satellite is fully autonomous, delivering accurate data without dependency on others.

• **Scalability:** Every new satellite added to our constellation instantly increases revisit rates and expands coverage, making the system stronger and more flexible.

For our clients—governments, navies, NGOs, and commercial operators alike—these advantages translate into actionable intelligence with fast response and high reliability. This is essential for missions where timing matters, from tracking vessels that switch off their AIS to detecting suspicious activity in remote waters.

With Unseenlabs' monosatellite technology, organizations gain faster detection, dependable intelligence, and stronger decision-making power, redefining what space-based RF detection can achieve.

Turning RF Detection into Actionable Intelligence

Technology alone is not enough—what matters is how it translates into operational value. That is the purpose of Unseenlabs' RF intelligence service.

Clients begin by defining the areas of interest they want to monitor, whether vast open-ocean zones, congested maritime corridors, or sensitive coastal waters. From there, Unseenlabs delivers intelligence tailored to each mission, ensuring that detections become clear, usable insights for decision-makers.

Two levels of service are available:

- **Standard:** regular monitoring of defined zones with reliable RF detections. Each RF data collection includes a comprehensive list of all detected emitters in standard format files, with geolocation coordinates, accurate timestamps, RF technical parameters, and dark ship detection and monitoring.

- **Advanced:** customized solutions for deeper analysis needs, including intelligence reports, technical training, a data visualization portal, and rapid support for urgent requests.

This service model ensures that intelligence is not only delivered, but also actionable, giving organizations the clarity they need to respond quickly and effectively.

For more details, the full product sheet is available here: here.

Looking Ahead:
Our Next-Generation Constellation

Innovation doesn't stop here. In 2026, Unseenlabs will launch its next-generation constellation, expanding beyond the maritime domain to include land and space monitoring alongside our proven ocean intelligence. This evolution will bring:

• Greater capacity and global coverage

• Enhanced precision and revisit rates

• New applications for defense, security, and sustainability

With this expansion, Unseenlabs will continue to lead the way in making the invisible visible — empowering governments, organizations, and industries with unmatched situational awareness across domains.

The West Philippine Sea concentrates the forces that will shape maritime security in Asia for years to come: vital sea-lanes, contested claims, strategic signaling, industrial and small-scale fishing, and fragile ecosystems under pressure. In such waters, transparency is not optional. It determines whether authorities can de-conflict operations, enforce the law, protect resources, and prevent incidents from spiraling.

By pairing time-separated RF campaigns over identical areas, assigning unique RF fingerprints to vessels of interest, and geolocating from a single satellite pass without triangulation, Unseenlabs provides independent, non-cooperative visibility that endures when AIS does not. The two campaigns presented here show how repetition converts detections into patterns, how fingerprinting preserves continuity through silence, and how an evidence-based picture of activity supports faster, more confident decisions—including in the most opaque areas such as the "Dangerous Ground."

As we expand our constellation and capability set, our aim remains the same: make the invisible visible so that our clients can act lawfully, effectively, and in time, even in the world's most contested seas.

Want to dig deeper into the unseen maritime domain?

Learn more about Unseenlabs and download our white paper to see how RF intelligence is transforming maritime surveillance worldwide.

Stay tuned by subscribing to our newsletter!

Illustrative photo

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About Unseenlabs

Unseenlabs is a leader in space-based RF detection. Our unique technology enables the geolocation and characterization of vessels at sea, anytime and under any weather conditions. The company delivers high-value data and solutions to help combat illegal activities, making its offering a benchmark across the space and maritime sectors.

In 2026, we will be launching our next generation constellation for multi-domain surveillance: sea, land and space.

KEY ADVANTAGES OF OUR SPACE-BASED RF TECHNOLOGY

LIMITLESS

Unlimited Detection Range
far beyond shorelines, unlike coastal radars

24/7, All-Weather Operation
effective day and night, even under cloudy or overcast skies

Global Operational Capability
not restricted by terrestrial or maritime borders

No Shipborne Equipment Required
independent of any onboard devices

Multiband RF Collection in a Single Pass
no need for multiple passes to cover different RF bands

Commercially Accessible Data
ITAR-free, available beyond public maritime security stakeholders

HIGH PERFORMANCE

Highly Interpretable
fully compatible with any standard GIS system

Accuracy to the Kilometer
enabling precise targeting for on-site inspections

Extensive Coverage
an average of 300,000 km² per RF data collection

Lightweight Data
less than 1 MB per collection file

Low Latency
optimized for both strategic and tactical decision-making

Frequent Revisit Time
coverage of the same area multiple times a day

Unseenlabs meets many actors' needs (marine insurance companies, shipowners, states, NGOs, etc.) by providing data and analysis for a better detection, and a more accurate tracking of illegal, undeclared or non-regulatory activities at sea (illegal fishing, overfishing, ocean dumping, etc.).
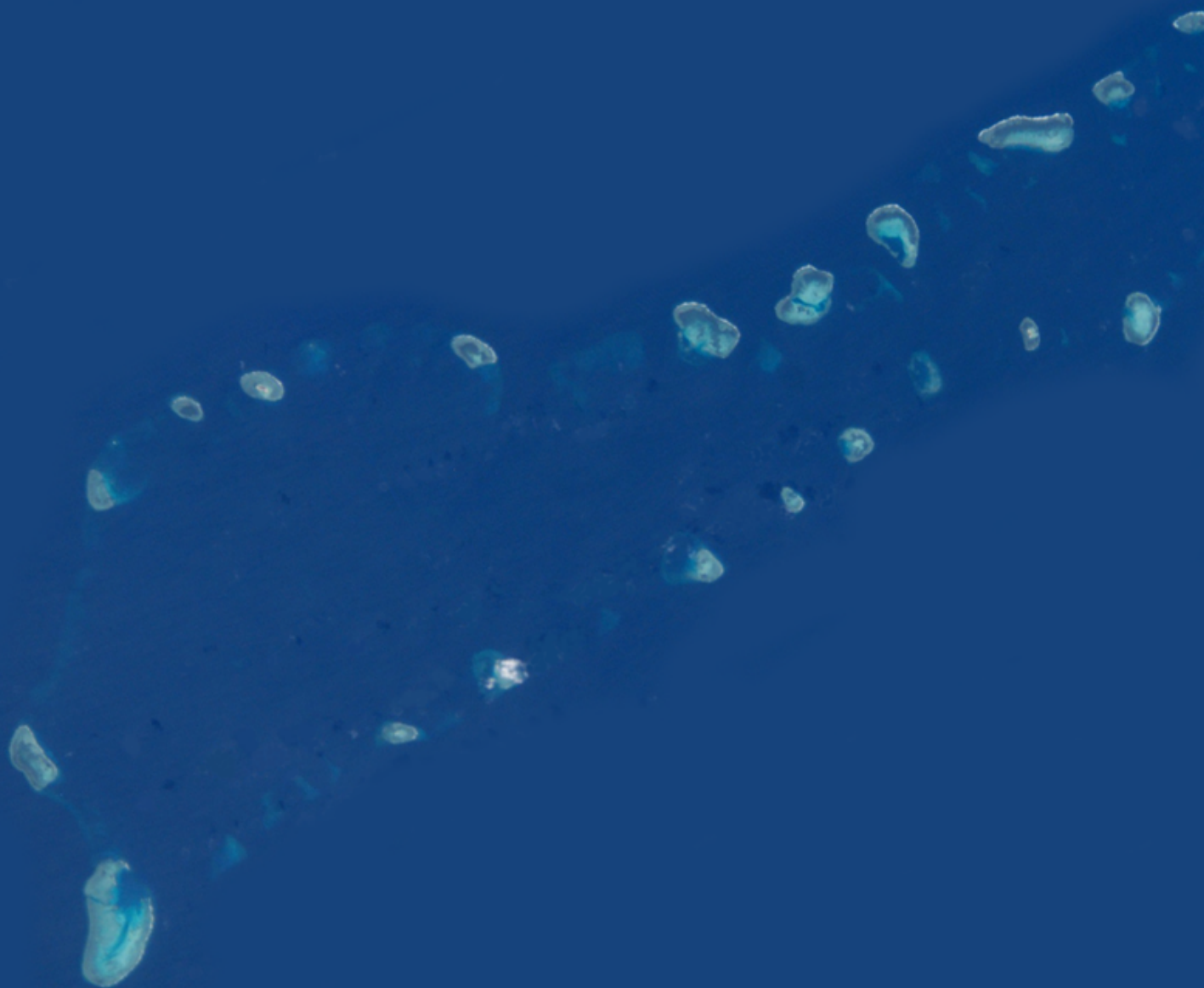
FISHERIES | CIVIL GOVERNMENT | INSURANCE | SHIPOWNERS | OFFSHORE ENERGY
BUSINESS INTELLIGENCE | SUBMARINE CABLE OPERATORS