use case unseenlabs

Unseenlabs Reveals Hidden Activity in the West Philippine Sea:

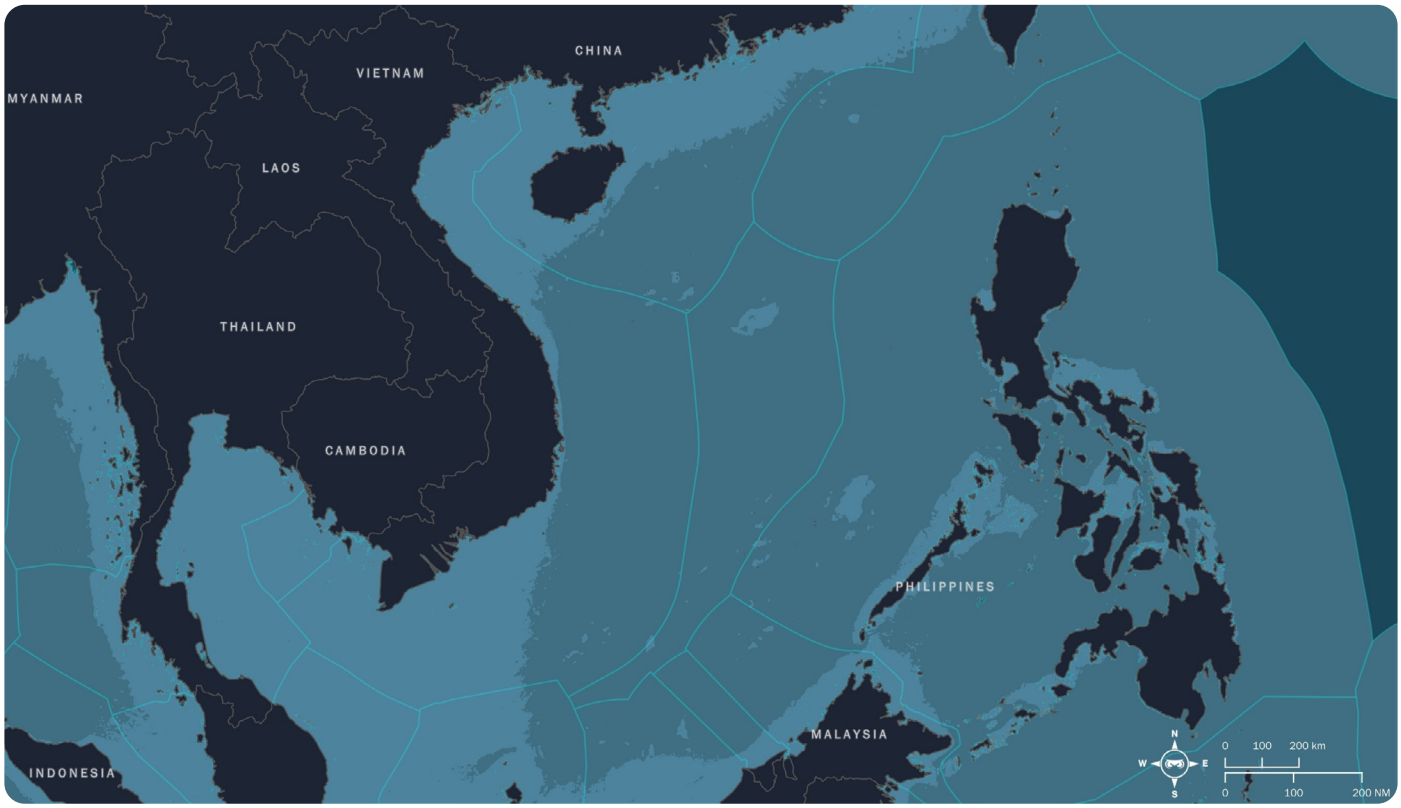
Case of Chinese Coast Guard Vessel Near Spratly Islands

Illustrative photo

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

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, they also followed a prominent CCG Guard vessel operating not far from the Spratlys; when its AIS[1] went silent, Unseenlabs' space-based RF intelligence[2] and fingerprinting maintained continuity and kept the track alive.



[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.

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.

[3] A 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.

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.

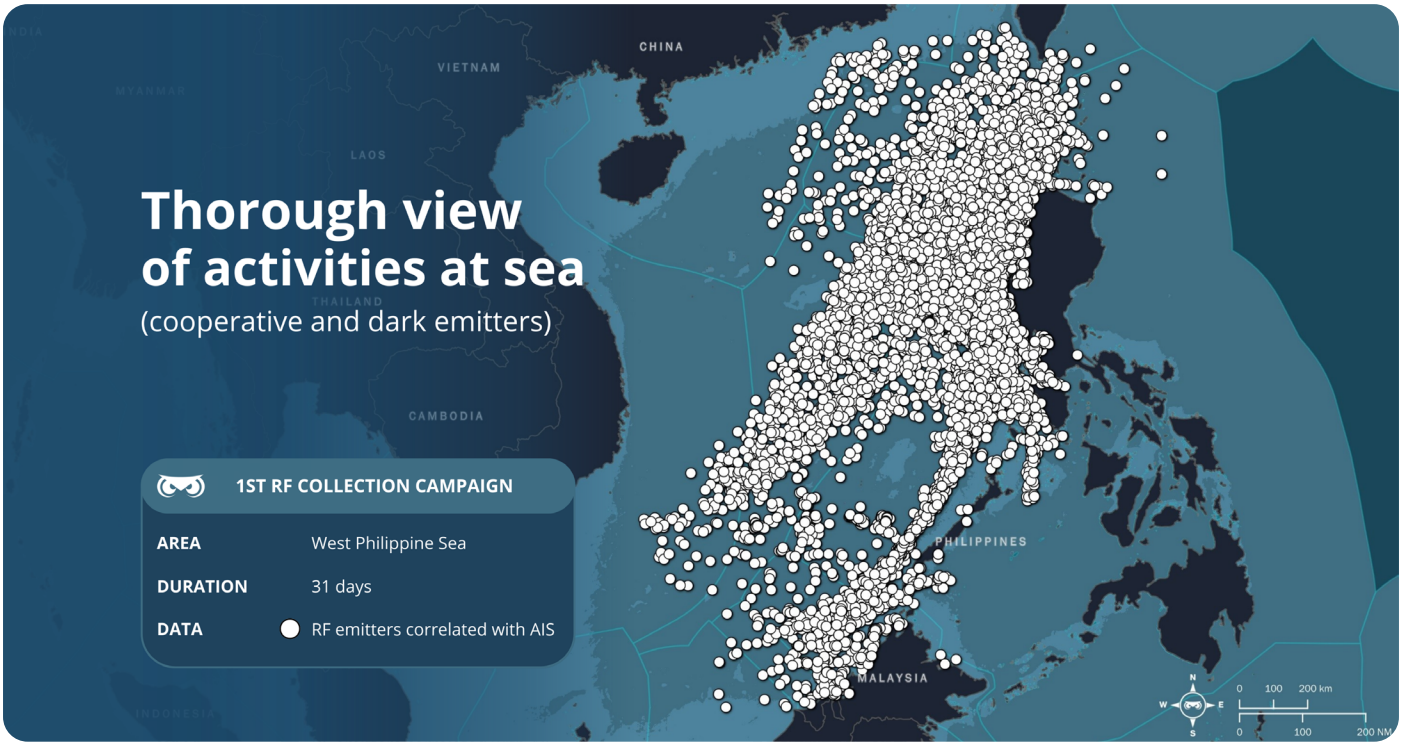
Some analysts warn that the Philippines risks becoming the "Ukraine of Asia"[4]: a frontline state where a smaller power's sovereignty challenge could escalate into a broader confrontation between major powers. While that outcome is not inevitable, the risks of miscalculation are real. Escalation would 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.

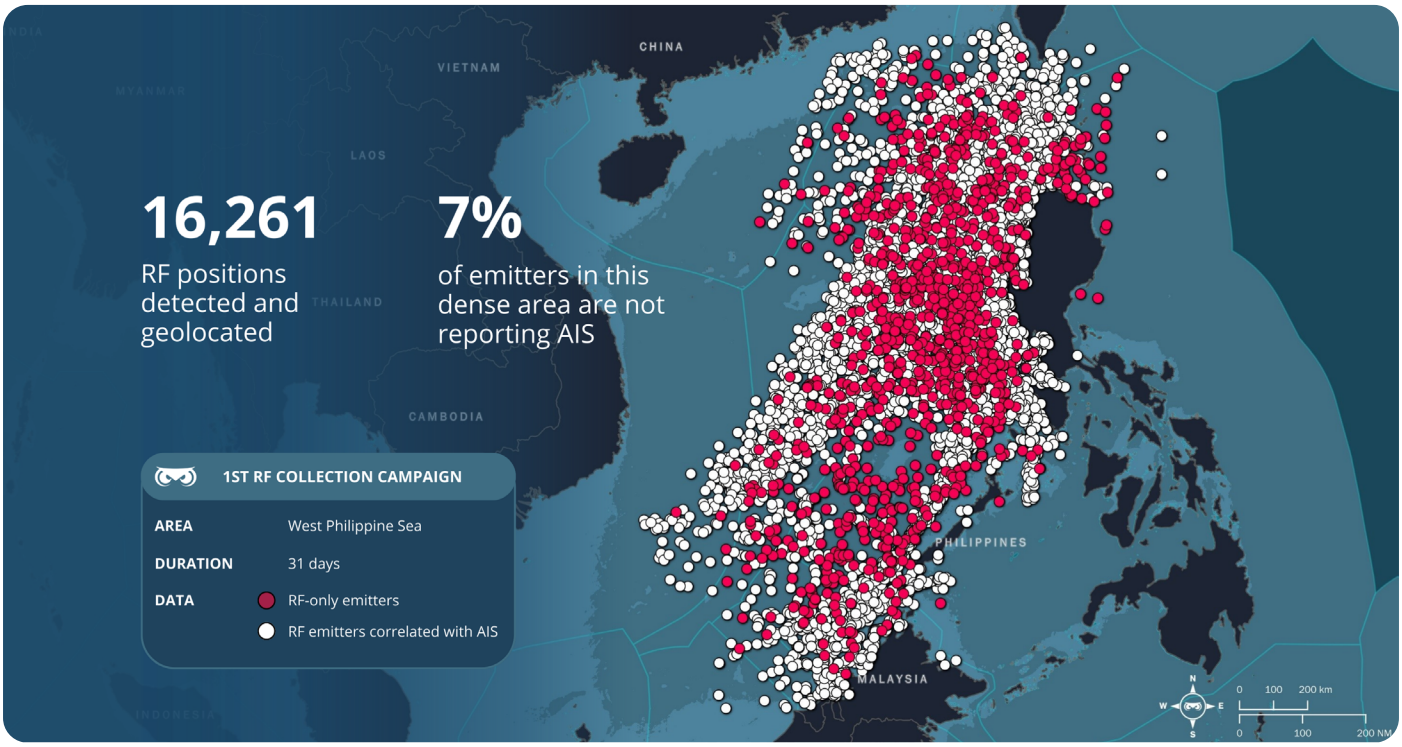
Monitoring the West Philippine Sea in Two Acts

First Campaign

[4] Can the Philippines become the 'Ukraine of Asia?' – Asia News Network

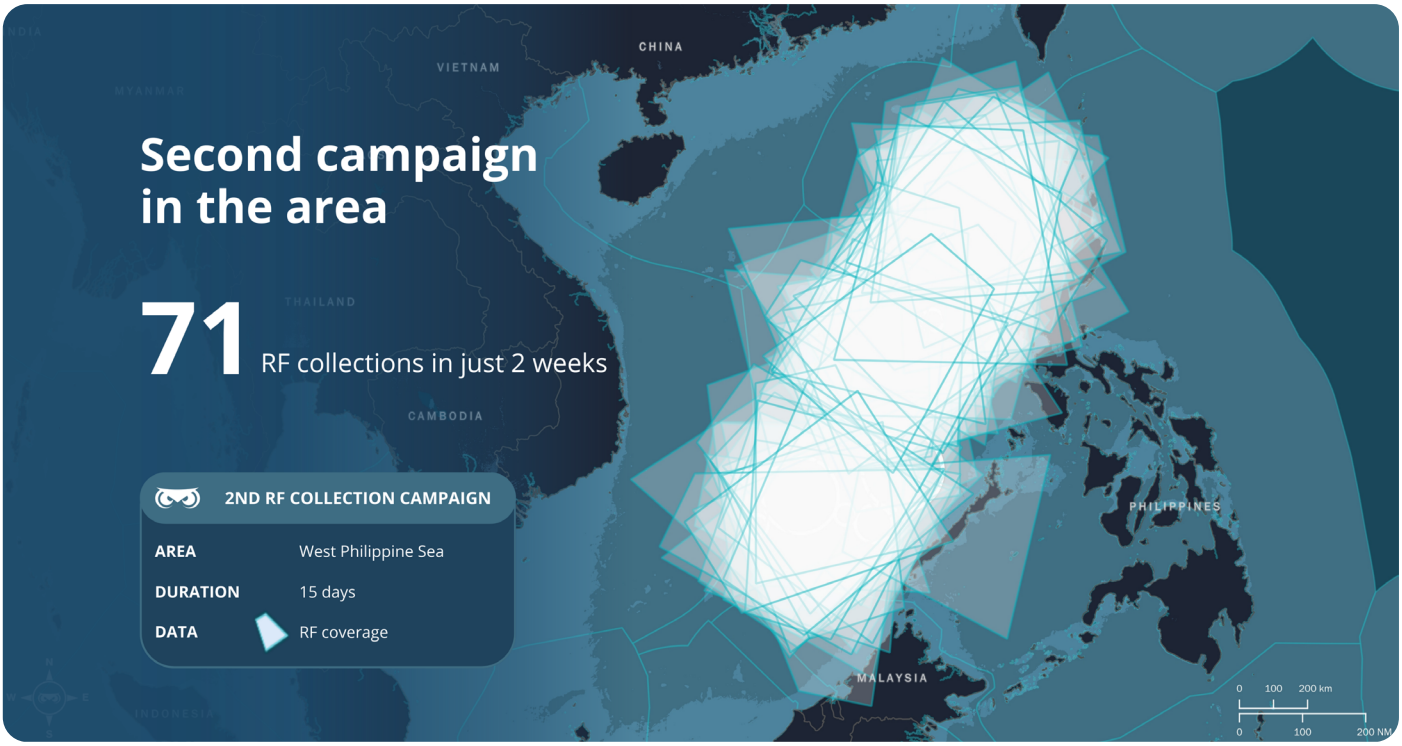


The first campaign lasted 31 days. During this period, Unseenlabs conducted 80 collections, with 3 to 4 revisits every day. Each collection covered an average footprint of about 300,000 square kilometers. In total, 16,261 RF positions were detected and geolocated.

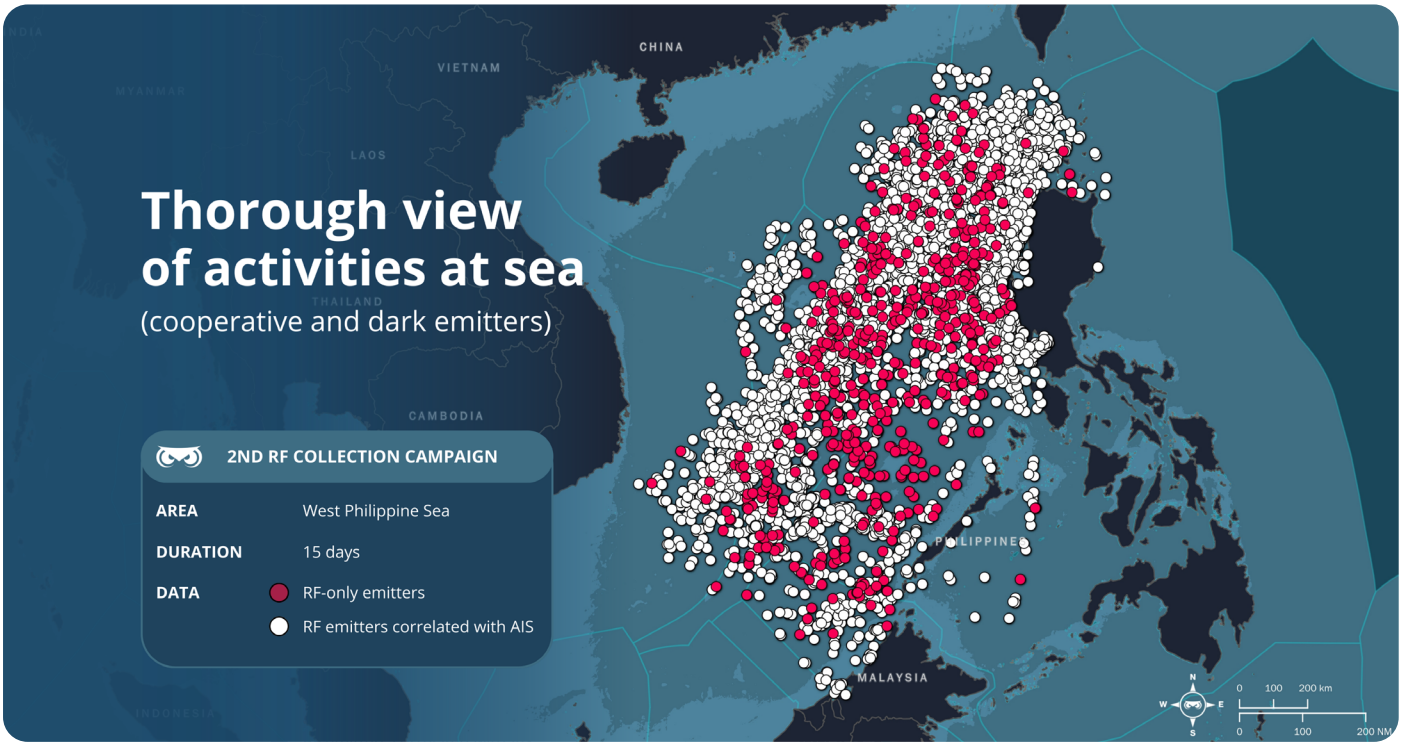


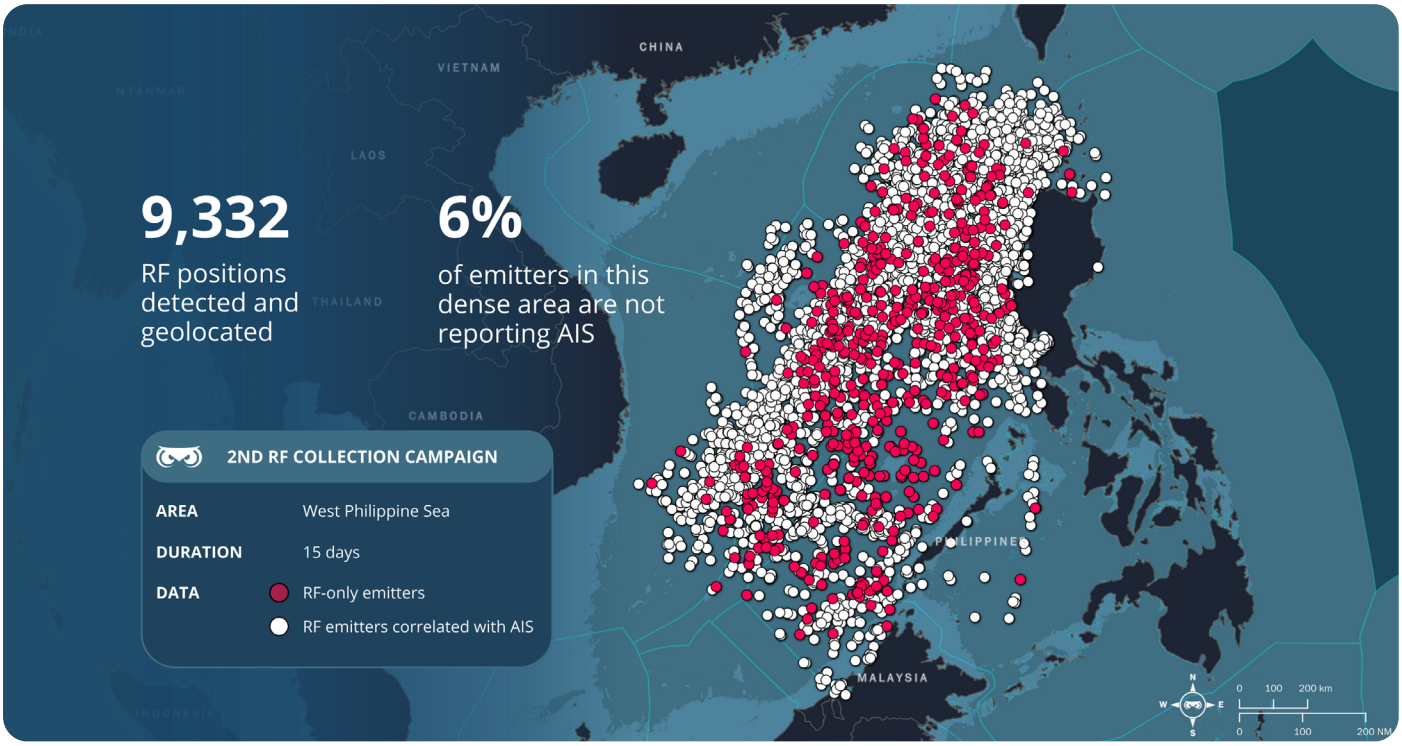
7% of the emitters identified during this campaign had no corresponding AIS signal, confirming the presence of vessels operating in the area without cooperative reporting.

Second Campaign



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.





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.

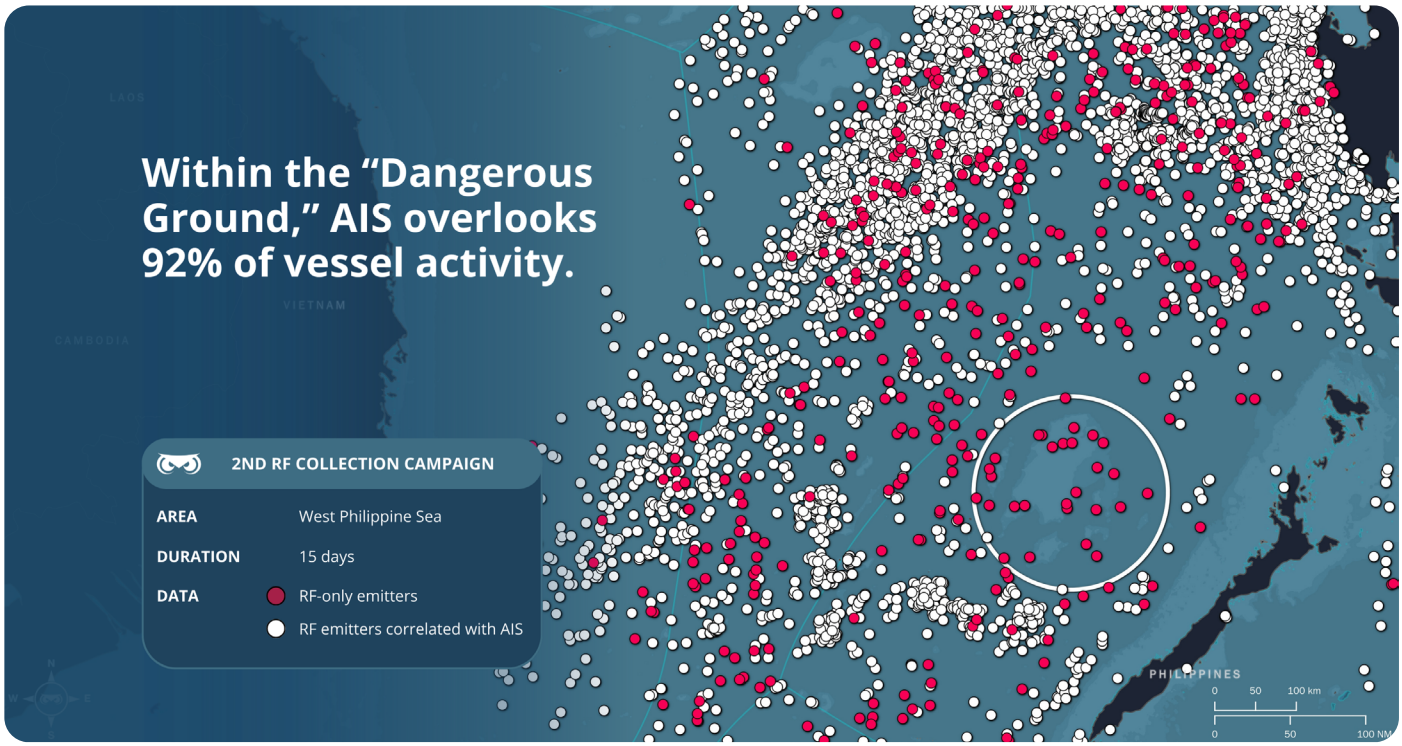
Finally, repeated coverage supports decision-making by giving clients evidence across time rather than at a single moment. This enables better risk assessment, more confident de-confliction, and sharper planning for enforcement or patrol missions.

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 not surveyed 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.

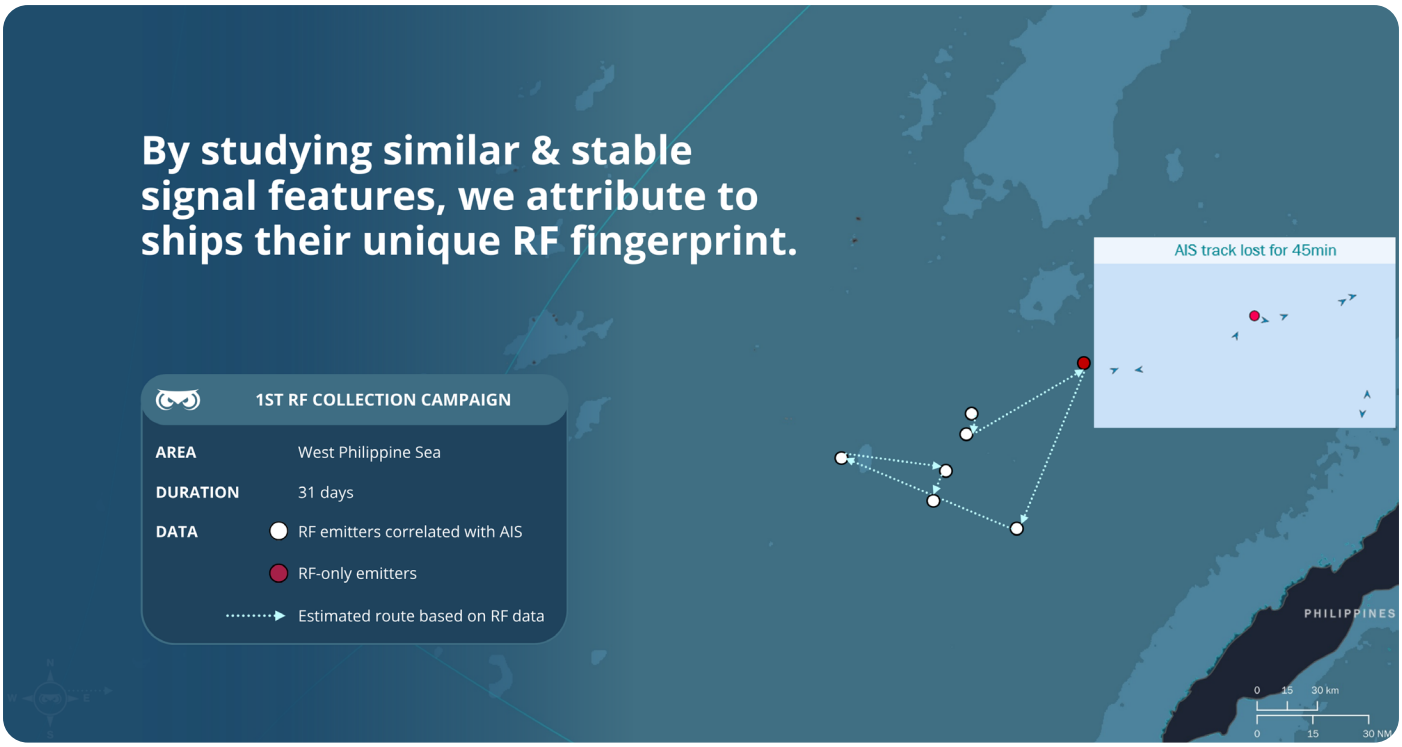


Unseenlabs' second RF collection campaign underscored the extent of this opacity. Over 15 days of monitoring, AIS missed 92% of vessel activity in the "Dangerous Ground." Independent RF intelligence filled this gap by maintaining continuity and exposing the full scope of traffic, including vessels that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



Open-source reporting has repeatedly described sustained CCG presence around disputed features in the South China Sea. While Unseenlabs anonymizes the specific identity here, the behavior they observed—persistent patrols, intermittent gaps in AIS, and movements consistent with sovereignty enforcement—aligns with that broader operational pattern.

Illustrative photo

Monosatellite Method: A Distinct Approach to RF Detection

Most space-based RF detection systems use triangulation, relying on clusters of satellites (often three) to capture the same signal and determine its position. In such configurations, if one satellite fails, the entire cluster's performance can be affected.

Unseenlabs uses a different approach. Each satellite can detect, analyze, and locate a signal independently, without the need for triangulation or coordinated clusters.

Because each unit operates autonomously, it functions as a fully capable observation platform on its own. As new satellites are added, the overall system increases its revisit frequency over areas of interest, improving the continuity of maritime monitoring.

From Detection to Insight

Detecting radio signals is only the starting point. The real value lies in interpreting what those signals reveal about movement and behavior at sea.

Unseenlabs gathers data over defined maritime areas, recording when and where emissions occur. Analysts then compare these detections with other available information, such as AIS or satellite imagery, to identify vessels that are active but not broadcasting their positions.

The resulting RF intelligence is used by clients—including governments, NGOs, and private-sector actors (shipowners, marine insurers, etc.)—to better understand maritime activity in regions where visibility is often limited.

Expanding Observation Capabilities

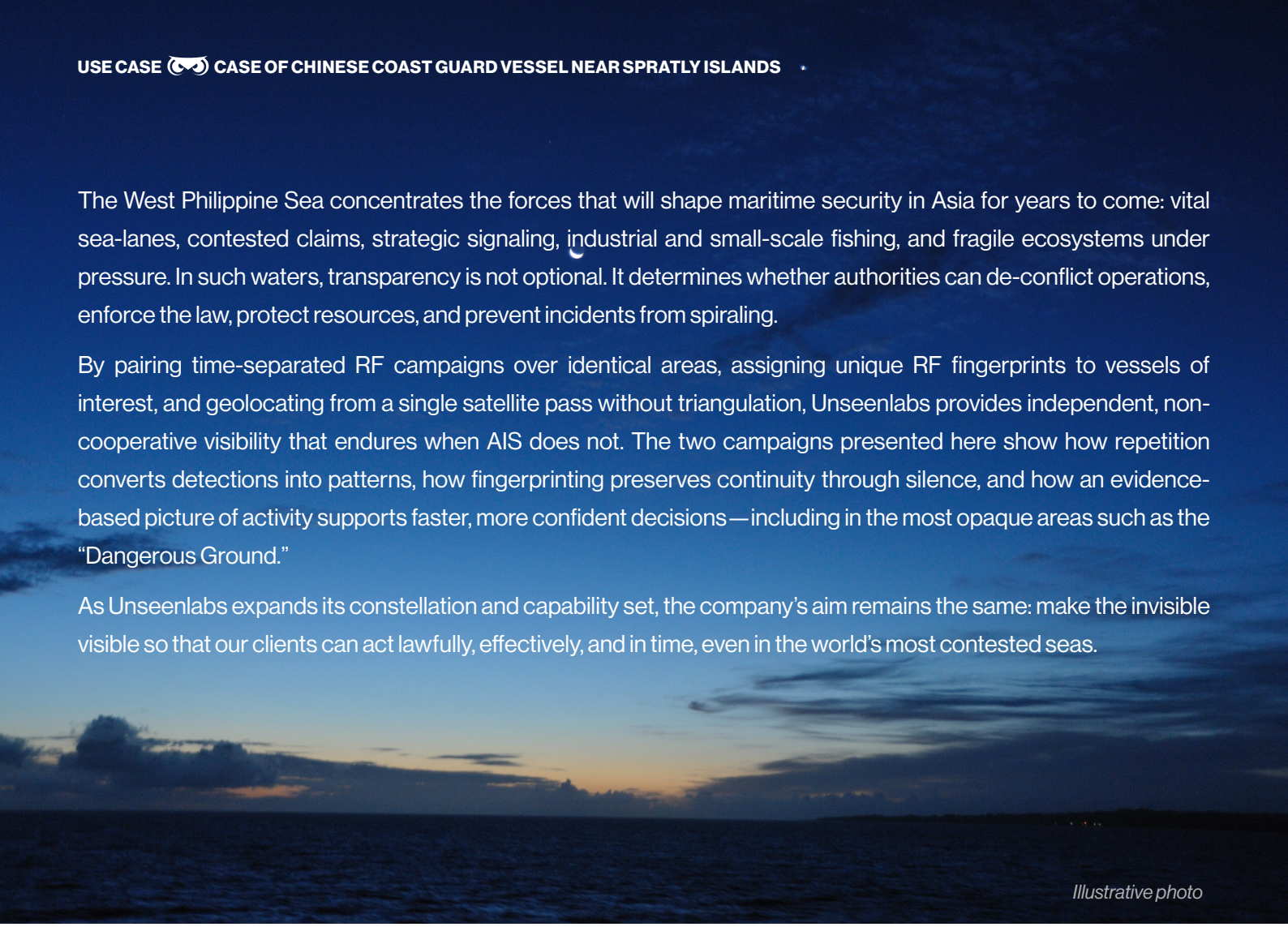
The company plans to expand its constellation starting in 2026 to improve revisit frequency and precision. The new satellites will extend monitoring beyond the maritime domain to include land-based and space observations.

This evolution aims to support a broader range of application, from environmental monitoring to security analysis, by providing more frequent and consistent observations in areas where activity often goes unrecorded.

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 Unseenlabs expands its constellation and capability set, the company's 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.



Illustrative photo

References

- Manila working on new protocols for dealing with Beijing in South China Sea
  The Japan Times
- Maritime Law Enforcement
  Windward
- Philippines Protests Fresh Chinese Deployments at Disputed Shoal
  The Diplomat
- Chinese Navy says Philippine warship 'illegally entered' Scarborough Shoal waters
  The Japan Times
- China rams own warship while chasing Philippine vessel
  BBC
- Militarized Commons: How Territorial Competition is Weaponizing Fisheries and Destroying the South China Sea
  STIMSON
- Territorial Disputes in the South China Sea
  Global Conflict Tracker
- Can the Philippines become the 'Ukraine of Asia?'
  Asia News Network
- South China Sea and the Gulf of Thailand
  National Geospatia-Intelligence Agency

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

No Shipborne Equipment Required
independent of any onboard devices

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

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

Global Operational Capability
not restricted by terrestrial or maritime borders

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

HIGH PERFORMANCE

Highly Interpretable
fully compatible with any standard GIS system

Lightweight Data
less than 1 MB per collection file

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

Low Latency
optimized for both strategic and tactical decision-making

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

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.).

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