



## The Virtual Watch Room

Pioneering technology to monitor and protect marine reserves

Monitoring and enforcement of marine reserves can be challenging in remote parts of the world, where many of the last near-pristine waters are found.

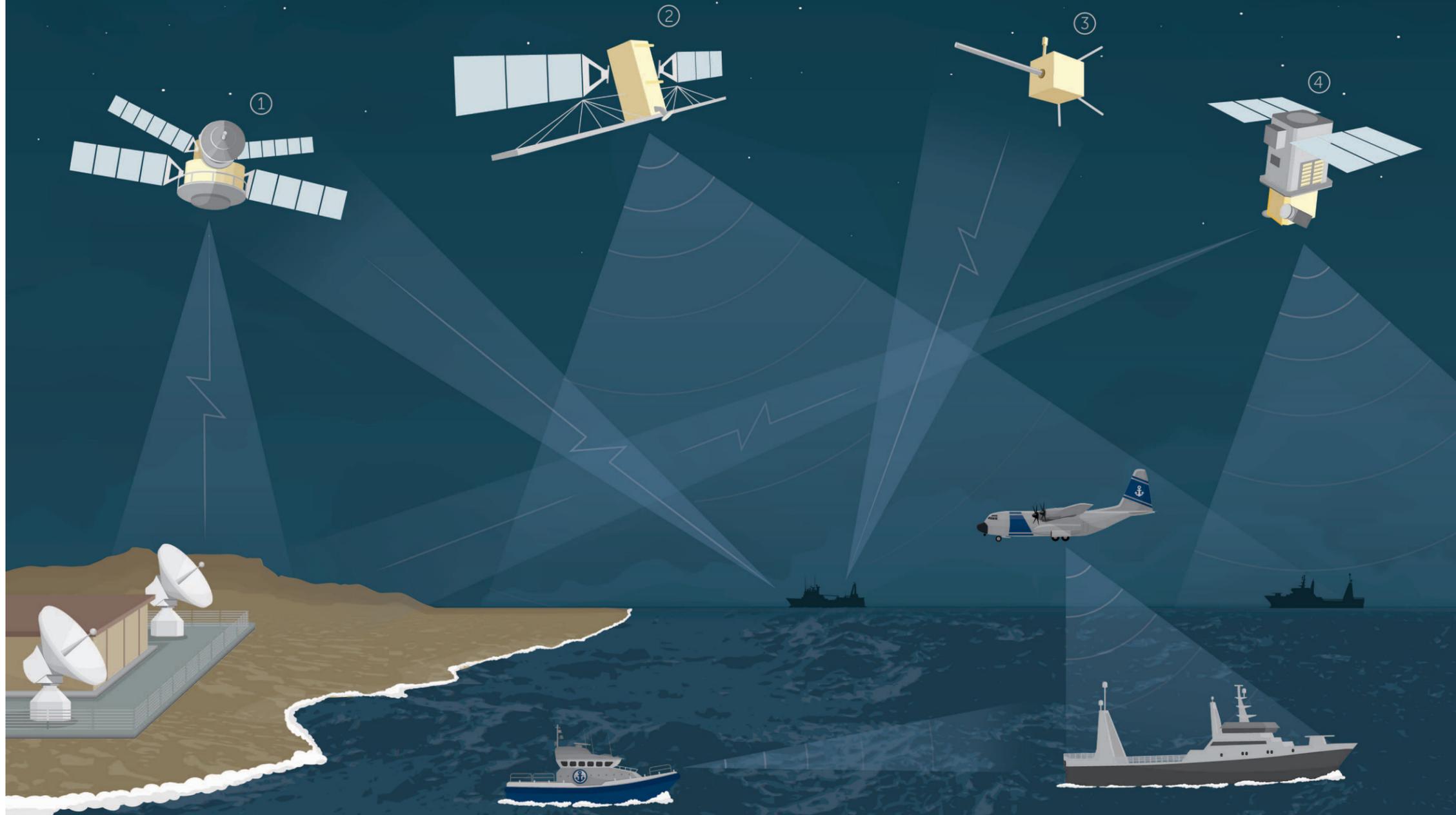
To help meet this challenge, The Pew Charitable Trusts has partnered with Satellite Applications Catapult, a U.K. government initiative created to help foster economic growth through the exploitation of space. Together, they have pioneered a system that enables government officials and other analysts to identify and monitor unlawful activities in global waters, particularly illegal, unreported, and unregulated fishing, sometimes referred to as pirate fishing. This cutting-edge technology merges satellite tracking and imagery data with other sources of information, such as fishing vessel databases and oceanographic data, to help monitor seas across the globe.

The partnership builds on work by the Catapult to develop a system that can synthesize and automate analysis of multiple data sources in near real time to identify vessels acting suspiciously. The system then can alert users so that they can investigate and take action. It is much more efficient than current processes and drastically reduces the human power required to detect and analyse suspicious activities.

Pew has made this work a priority to help answer the question of how governments can protect large-scale marine reserves. In response to growing needs, Pew has initiated a Virtual Watch Room—focused on marine reserves—that will be powered by the Catapult system.

The Virtual Watch Room for marine reserves is just one of the projects that Pew and the Catapult are working on to develop technological and policy approaches to stop illegal fishing in the world's oceans.

# The Virtual Watch Room



① **Vessel Monitoring Systems, or VMS**, aboard vessels broadcast GPS coordinates, speed, and other data to a fisheries monitoring center via satellite.

② **Synthetic Aperture Radar, or SAR**, satellites circle the globe day and night, independent of weather conditions, and can detect vessels in remote areas.

③ **Automatic Identification Systems, or AIS**, broadcast a vessel's identity, position, and other information by VHF radio to nearby vessels and coastal stations and are mandatory under the International Convention for the Safety of Life at Sea for all commercial vessels larger than 300 gross tons.

④ **Optical Satellite Sensors** provide high-resolution imagery and oceanographic and atmospheric data and can continuously cover one small area.

This cutting-edge technology analyses critical data, including satellite imagery, proprietary fishing vessel databases, and maritime boundaries, to help authorities monitor seas across the globe.

**VIRTUAL WATCH ROOM** 📊 ⚙️

**PALAU**  
Vessels in area: 11    Active alerts: 4 ⚠️

This greatly reduces the time and effort needed for analysts to detect vessels—from among the hundreds of thousands at sea at any given time—that may be acting illegally.

**VIRTUAL WATCH ROOM** 📊 ⚙️

**PALAU**  
Vessels: 4  
DATE: 12-12-14  
TIME: Midnight

**VIRTUAL WATCH ROOM** 📊 ⚙️

**PALAU**  
Vessels: 1  
Vessel type: Fishing  
Alerts: Fishing pattern

- Suspicious or illegal activity
- Requires analysis
- Low interest

## Using the Virtual Watch Room to identify suspicious activities

- The application is designed to hold and cross-reference vast amounts of data so that when fused, the results can help identify suspicious vessel activity in an efficient and cost-effective way.
- The information includes multiple sources of satellite data, vessel and other specialist databases, international fishing and marine reserve boundaries, and oceanic data such as depth and temperature.
  - The system can activate the most appropriate surveillance method to see vessels that are not transmitting their positions.
- Automatic alerts are triggered when the computer, using specially designed algorithms, detects:
  - Patterns of vessel movements or speeds typical of fishing.
  - When a vessel has stopped signaling its position.
  - Two vessels in close proximity, a possible sign of transshipment of fish or other goods.
  - When a vessel crosses a virtual geofence to enter a marine reserve or other area of restricted use.
- Alerts are investigated by trained analysts.
- Analysts notify relevant government enforcement of highly suspicious activity and transfer a data package of supporting evidence.
- Governments proceed with enforcement action or other appropriate response.

As the system develops into the next phase, new data sources will be integrated to add emerging technologies and respond to evolving needs. Among the potential sources are additional satellite imagery, various types of optical imagery, imagery from unmanned aerial vehicles, crowd-sourced photographs and sightings, electronic signals such as radar on ships, and possibly radio broadcasts.

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### For further information, please visit:

[virtualwatchroom.org](http://virtualwatchroom.org) [pewtrusts.org/endillegalfishing](http://pewtrusts.org/endillegalfishing)

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**Contact:** Andrea Risotto, communications officer  
**Email:** [arisotto@pewtrusts.org](mailto:arisotto@pewtrusts.org)  
**Project website:** [virtualwatchroom.org](http://virtualwatchroom.org)



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**Contact:** Satellite Applications Catapult  
**Email:** [marketing@sa.catapult.org.uk](mailto:marketing@sa.catapult.org.uk)  
**Project website:** [sa.catapult.org.uk](http://sa.catapult.org.uk)

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