



Automatic Identification System

AIS is an automatic vessel tracking system that can be used to detect illegal fishing, provide transparency at sea, enhance traceability of seafood, and improve maritime safety.

What is AIS?

Automatic Identification System (AIS) is a vessel tracking system that transmits a vessel's location, behavior, and identity. This includes the name, unique vessel identifier, callsign, size, flag state, and type of the vessel, along with its speed, direction, and geographical position.

AIS was initially developed to increase maritime safety, reduce vessel collisions, and enhance awareness of vessel locations at sea. It functions as the “eyes of the boat,” enabling vessels to “see” each other's location and activity—of critical importance at night and in hazardous conditions.

With tens of thousands of ships operating daily in U.S. waters, AIS technology is a vital tool in maintaining maritime domain awareness. AIS transmits identity information as well as position and transit data, making publicly available who is in U.S. waters, where they have been, and which other ships they may have met up with.

Why is AIS critical?

Commercial fishing has the highest fatality rate of any occupation, and its workers are over 30 times more likely to die on the job than the average. Using AIS is one way to improve safety in an incredibly dangerous profession.

AIS can be an essential tool for monitoring fishing vessels, providing high-quality special data and is invaluable for transparency and monitoring as it allows fisheries managers and authorities to detect suspicious and illegal behavior.

AIS devices can be tracked through publicly available platforms like Global Fishing Watch (GFW). This international nonprofit organization, founded by Oceana, Google, and SkyTruth is dedicated to advancing ocean governance through increased transparency of human activity at sea, processes satellite collected data, including from AIS devices, to map fishing activity across the world's oceans.

At an Oceana roundtable event focused on Illegal, Unreported and Unregulated (IUU) fishing, former Secretary of the Navy Ray Mabus said, **“When [IUU boats] ‘go dark,’ they become a maritime danger to anyone in the area, and that includes our Navy—first because of the risk of collisions at sea, but also because you can’t tell what they’re up to. It could be IUU, but it could also be piracy, or human trafficking, or weapons smuggling, or almost anything.”**



The transparency of knowing where vessels are, and what they are doing, brings illegal behavior to light and discourages environmentally, economically, and socially harmful fishing practices. These activities can include anything from foreign vessels illegally entering a country's exclusive economic zone (EEZ) and stealing fish, to fishing fleets pillaging endangered species in marine protected areas.

How does AIS work?

The AIS device is a very high frequency (VHF) radio that broadcasts the vessel's location and identity and a GPS receiver that detects incoming signals. AIS transmissions can be picked up by neighboring vessels, land-based receivers, and satellites.

AIS transponders come in three classes (A, B, and B+) which determine how frequently the vessel transmits a signal and how strong that signal is. Class A transponders are the most robust, Class B devices broadcast a weaker signal at a fixed interval, and Class B+ emit a medium strength signal.

What vessels are required to transmit AIS?

The United Nations Convention on the Law of the Sea requires Class A AIS devices on all large cargo vessels (over 500 tons) and all passenger vessels regardless of size.

The United States requires all fishing vessels over 65 feet to transmit AIS while operating in U.S. navigable waters, defined by the Coast Guard as the territorial seas of the U.S., which extend 12 nautical miles from shore. In the European Union, all fishing vessels over 49 feet are required to carry and transmit AIS constantly, with a few exceptions, while underway anywhere in the world.

What are the limitations?

- The effectiveness of AIS for safety and transparency is stunted by limited legal requirements; only U.S. vessels over 65 feet are required to carry AIS.
 - Only 12% of the more than 19,000 U.S. registered commercial fishing vessels meet the length of 65 feet requirement.
- U.S. non-passenger vessels are only obligated to transmit AIS within "U.S. navigable waters," which are defined as waters within 12 nautical miles of shore.
- Vessel operators can tamper with their AIS to falsify their location or identity—a practice called "spoofing"—or turn off their AIS altogether. While there may be legitimate reasons to disable an AIS device, it can also be done to mask illegal activity.
- Class A transponders transmit position data every 2-5 seconds while Class B+ transmits every 5-30 seconds. Class B transponders are the weakest devices, transmitting every 30 seconds. Many fishing vessels equipped with AIS use the weaker Class B or B+ transponders, substantially reducing the safety and transparency benefits.
 - Of all the visible U.S. vessels (fishing and non-fishing) on the Global Fishing Watch (GFW) platform, only 25% have Class A transponders, and only 20% of visible U.S. fishing vessels have a Class A transponder.
- Platforms like Global Fishing Watch display AIS data in near-real time, meaning the map has a 72-hour delay. GFW shows where fishing activity has occurred in the past, it does not display the current location of fishing vessels.



What does Oceana recommend?

To further increase transparency, maritime domain awareness, and safety at sea, Oceana recommends the U.S. to:

Expand existing AIS requirements to transmit for the duration of the voyage: Amend the requirements to explicitly require AIS transmission throughout the vessels' entire time at sea.

Require fishing vessels 49 feet or longer to transmit AIS using Class A devices: Following the EU requirements, require all U.S. fishing vessels 49 feet (15 meters) or longer to carry and transmit AIS in the U.S. EEZ and on the high seas.

Notification of all AIS-off events: Require U.S. vessels to notify the Coast Guard when a fishing vessel operator stops transmitting AIS within four hours of the halt in transmission.

Require all U.S. fishing vessels to be equipped with Class A AIS devices: Because of coverage gaps with Class B AIS devices, the United States should remove the exemption in 33 C.F.R. § 164.46(b)(2)(i) to facilitate enhanced vessel monitoring with the stronger Class A device.

How does AIS compare to VMS?

- Some fishing vessels are required to carry vessel monitoring system (VMS) technology, which is also used to track vessels via satellite. VMS was designed for fisheries monitoring and provides myriad benefits: consistent detection by satellites, protection from spoofing, and more reliable signal transmission.
- However, in the U.S., VMS is required only on certain types of fishing vessels. Only 2,000 U.S. vessels are equipped with VMS versus almost 54,000 with AIS visible from Global Fishing Watch. VMS data are proprietary and only accessible by the government to which the vessel is registered.
- The VMS device costs approximately \$4,000 and can incur thousands more in fees throughout the vessel's lifetime. Class A AIS devices cost between \$749 - \$3,500 and have no associated fees.
- While VMS can be an essential tool for monitoring tool for monitoring fisheries, the high temporal resolution of AIS (which transmits signals every few seconds versus VMS transmitting as little as once per hour), along with its lower cost, near real-time reporting, public availability, and mandatory carriage render it invaluable for mitigating collisions and enhancing users' situational awareness. AIS and VMS are two distinct systems that work best together but are not inter-operable or compatible.



By using both VMS and AIS systems, the benefits are combined. With the high resolution (more signals per day) of AIS, in conjunction with the security of VMS, monitoring is substantially improved.

	Automatic Identification System (AIS)	Vessel Monitoring System (VMS)
Publicly available data?		*
Potential pings per hour	1,800	1-4
Signals increase with vessel speed?		
Required on all vessels greater than 65ft?		
Number of vessels carrying (x1000)		
Tamper-proof?		
Typical cost	\$	\$ \$ \$

* Except where a country has decided to publicly share VMS data