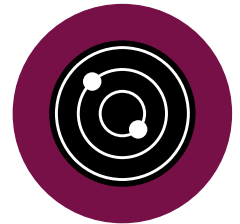


In the crosshairs

AIS is outgrowing its original safety role as it is deployed by countries around the globe to address security issues

Words: Kevin Tester



AIS is a well-established technology initially designed as an anti-collision aid. But, many nations around the world have discovered that it is capable of much more. Notably, the countries showing the most imagination and ambition are not the heritage maritime nations of northern Europe, but territories further afield such as Bahrain, Ghana, India, Kenya, Malaysia, and Thailand among others.

"AIS is the optimal communications platform for a plethora of applications because it was designed from the ground up for marine. It's a mesh system so a single device can support ship-to-shore, ship-to-ship and ship-to-space [for satellite]," said Simon Tucker, chief executive of SRT Marine, a manufacturer of AIS hardware.

Each of the countries vary their implementa-

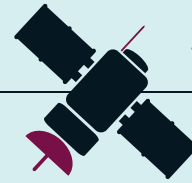
tion according to their individual requirements and specific objectives. For example, India has a fleet of 200,000 small motorised fishing boats. Following the Mumbai shootings of 2008, the authorities decided to track all their boats and AIS was deemed the most practical technology to accomplish this. Since then they have installed one of the world's largest and most sophisticated AIS systems and are now fitting transceivers on all Indian registered vessels.

"The customised transceiver on the boat always knows where it is. Moreover, it has a geofencing capability, so it alerts fisherman in Gujarat if the boat approaches within 1km of the Pakistani border. Similarly, in the south of the country it alarms when encroaching the Sri Lankan border. It also provides a panic button to let fisherman quickly alert the authorities if they get into trouble," explained Tucker.

Licence plates

Furthermore, the viewing systems on shore can use AIS position reports as a sort of electronic licence plate for boats, from which they can check the validity of fishing licences. "Some countries are experimenting with dynamically managing licences, i.e. where allowable fishing zones vary over time. This is only possible if you have real-time electronic communication," elaborated Tucker. An integrated short messaging system is also well-suited to delivering warnings to mariners about impending heavy weather or tsunami.

In the Middle East, algorithms have been created to detect two fishing vessels that stop alongside for a short period of time, which is tell-tale sign of nefarious activities. "It can indicate illicit transshipment of fish they've illegally caught on to another vessel. Or perhaps,



arms dealing or something going on. Normally at sea, you want to give other vessels a wide berth or simply pass them," explained Tucker.

Similarly it can help pinpoint boats not licensed to fish but circling around a known seamount (where fish typically gather). This is when fusing AIS data with more traditional surveillance methods such as radar or satellite photography pays off.

Both China and Russia are using AIS along rivers and extensive inland waterway systems. "The number of vessels involved is enormous, so the national fleet tracking systems they're investing in are, in many respects, far ahead of those deployed in Europe and the USA," the CEO commented.

Crime prevention

In Mexico, AIS has proved useful for detecting illegal drug trafficking, because vessels also become conspicuous by absence of a signal. "If a boat switches off its AIS or doesn't carry one in the first place and is subsequently spotted on radar or on satellite imagery, it is flagged for investigation," Tucker said.

The same principle was employed with great success in the Strait of Malacca in the fight against piracy. "Radar alone does not show you who the bad guy is. But in combination with AIS it lets you discriminate. As an authority, you narrow down the potential targets from thousands to tens."

AIS can also contribute in a crew welfare role. "In Africa, if fisherman go out to sea and don't return when planned, concerned family members would call the authorities to ask whether or not they were alright. AIS makes it much easier for them to quickly provide concrete information on their whereabouts."

The common thread to most applications, however, is security. But not just against terrorist threats or piracy. "Food security is a major impetus. These countries typically have a much closer relationship with their food chain than we do. In Indonesia, the size of fish is almost a matter of national security because high percentage of protein in the population's diet is derived from fish. If fish are getting

smaller or stolen [by fishing boats supplying other nations], then people cannot eat. And if they get hungry for too long, that's a recipe for social unrest or civil disturbances, even political revolution."

Development focus

SRT Marine started out primarily as a manufacturer of AIS transceivers. Over time it has expanded into infrastructure requirements: "Coastlines in these countries are often far more hostile than Europe so you can't simply go out and put a tower along the coast line. It would be ripe for attack or simply get stolen. This is where fusing terrestrial data with that from satellites into its own."

Satellite AIS was introduced almost a decade ago. Early systems were not great at detecting and 'decolliding' an agglomeration of weak radio signals from multiple ships. Since then the technology has advanced substantially and many of the early limitations and shortcomings have been overcome. More recently SRT worked in partnership with the Canadian orbital ship position data collector ExactEarth to make AIS signals more satellite friendly. Of course, satellite is never real time due to the inherent latencies, thus systems use coast stations for busy areas and where possible along the coast and satellite to cover areas out of range.

The challenge now is to making all this data easier to sift and mine. "Viewing systems have changed dramatically in recent years. People have this impression of a controller with smart lapels sitting in a chair keeping a watchful eye on a dozen or so dots on a screen," said the AIS expert. "But with incoming position reports numbering in their thousands, the reality today is very different. The pivot point was developing a management system that will monitor and automatically sift as much of the data as possible."

In 2013, the company launched GeoVS, a home-grown visualisation application engineered to meet the requirements of maritime domain awareness. "Shore-operators don't need to see all vessel traffic all the time: they would be overwhelmed. In combination with filters and alerts to unusual activity, GeoVS lets them zero in on areas of interest. Ship types are then depicted pictorially rather than indistinguishable triangles. In addition, the water can be shaded according to depth. These refinements make a major difference in assimilating a situation at a glance." ■

Satellite communications news round-up

- Inmarsat has successfully launched the third satellite in its Global XPress (GX) programme. The Inmarsat-5 F3 was lifted from the Baikonur Cosmodrome in Kazakhstan on 28 August. It will serve the Pacific Ocean Region. Company CEO Rupert Pearce said: "The completion of the GX constellation is a significant milestone for our organisation and is fundamental to the delivery of a new era in mobile satellite communications". The first GX satellite – Inmarsat-5 F1 – was launched in December 2013 and entered commercial service in

July 2014, covering Europe, the Middle East, Africa and Asia. Inmarsat-5 F2 followed in February this year, which covers the Americas and the Atlantic Ocean.

- Meanwhile Intelsat has successfully launched its Intelsat 34 satellite. Among other functions, it will illuminate Latin America and the north Atlantic with additional Ku-band coverage to boost connectivity at sea.

- South Korean antenna manufacturer Intellian has partnered with Telenor Satellite Broadcasting (TSBc) to

develop Ka-band antennas for the maritime market that can connect with the Norwegian satellite operator's Thor 7 bird. The orbital position of Thor 7 provides a favourable look angle over the main European shipping lanes, utilising relatively small spot beams to deliver high-throughput broadband. Intellian's new antennas - v60Ka and v100Ka - will be based on an iDirect platform.

- Dutch shipping company Vroon has contracted satcoms-provider Speedcast to deliver high-speed

broadband to a selection of 'floatels'. The Ku-band satellite service is dimensioned to give multi-megabit speeds, providing 'hotel-grade' Internet facilities to crew and passengers aboard subsea-support vessels (10-25 pax), walk-to-work vessels (up to 60 pax) and wind turbine installation/maintenance vessels (up to 110 pax). In a separate Middle Eastern deal, the company will bring Ku-powered connectivity to nine jack-up barges operated by Gulf Marine Services.