

## New technologies at the forefront of anti-piracy measures

As piracy incidents increase, shipowners are looking for new arrows in their quivers to help avoid ransom situations and keep vessels and crews safe and sound. More ships are beginning to carry armed security crews, but a number of non-lethal technologies have given hope that the front line in the war on piracy is not soldiers, but scientists.

Generally, once pirates board a vessel, it's too late to do anything about the situation. Therefore, most anti-piracy technology focuses on preventing that from happening. Systems that work at a distance are the most desirable.

Some, like Acoustic Hailing Devices, have been around for years, and have already been proven in incidents like the 2005 pirate attack on the cruise ship *Seabourn Spirit*. Others, like the Active Denial System (ADS) – known informally as “the pain ray” – sound more like the stuff of science fiction.

Acoustical hailing and warning devices use directed-sound technology to broadcast a penetrating warning tone, powerful voice transmissions or other sounds. Effective from more than 1,000 yards, these tools buy time for the crew of the endangered vessel to assess the threat and identify and deter their attackers.

LRAD Corp. (formerly American Technology Corp.) is

a leading producer of these devices, and manufactures units in varying sizes and cost configurations. The units can produce a deterrent sound, or they can be connected to an MP3 player or other device to broadcast recorded sounds – including messages in the attackers' language.

“A lot of times the story gets picked up about the deterrent tone, but most of the time we're not really even getting to that point,” said Scott Stuckey, vice president for business development at LRAD. “It's the communication – it's telling pirates we can see them, that they've lost the element of surprise. There are a lot of targets out there. They're going to look for a softer target.”

In addition, he said, the U.S. Navy has been using LRAD units for communication and deterrence, and then escalating to weapons. Pirates are starting to expect LRADs to be followed by gunfire, a conditioning effect that benefits even unarmed vessels.

Newer models can be controlled remotely from control units mounted on the bridge or in safe rooms, and aimed with the ship's radar or thermal imaging systems. Some also include laser “dazzlers” and spotlights to temporarily blind attackers.

New Jersey-based Laser Energetics Inc. sells standalone handheld lasers with an effective range of about 2,800 yards. The Dazer Lasers are waterproof, sidearm-sized units carried in holsters, and when fired can impair targets'

vision and cause a loss of equilibrium and nausea.

ADS, another new technology, was developed by the Air Force Research Laboratory and the Department of Defense, in secret – and at great cost.



Courtesy LRAD Corp.

The ADS “emits a focused beam of wave energy that travels at the speed of light and penetrates the skin to a depth of 1/64 of an inch, producing an intolerable heating sensation that causes targeted individuals to flee,” said John Patterson, spokesperson for Raytheon, which sells a mid-range ADS called Silent Guardian. “The sensation immediately ceases when the targeted individual moves away from the beam.”

Silent Guardian is effective from more than 800 feet. Military models work at more than twice that distance. The beams can penetrate clothing, but not stone or metal. Raytheon's product literature says Silent Guardian can operate in maritime environments, though its effectiveness in piracy situations is untested.

The marketplace is full of additional products, with more appearing all the time. New out of the Netherlands is Secure-Marine's SecureShip, a collapsible electric fence set up around a vessel's perimeter. Boarding attempts trigger alarms and flood lights, and intruders are given a non-lethal 8-joule shock – enough to hurt, but not kill.

There's also an anti-traction gel developed by Southwest Research Institute (SwRI) for the U.S. Marine Corps that can even be sprayed onto vertical surfaces, and may act



Courtesy Raytheon Co.

**Upper left, acoustical hailing and warning devices, like this ship-mounted one from LRAD Corp., employ directed-sound technology. They can broadcast a penetrating warning tone or powerful voice transmissions and have an effective range exceeding 1,000 yards. Above, the Silent Guardian Protection System, from the Raytheon Co., uses millimeter wave technology to repel individuals without causing injury. Raytheon says it is suited for marine environments but it has not been tested as a piracy deterrent.**

as a last-ditch defense against boarding pirates. Company spokeswoman Maria Martinez said SwRI is currently discussing licensing agreements to adapt the mobility denial system for anti-piracy applications.

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