

Lockheed Martin offers RFID functionality with its decoy-launching system, to help international navies ensure they fire the proper rounds.

By Claire Swedberg

Dec. 14, 2009—Two years ago, a NATO member country first began using an RFID component for its navy's automated launch of expendables (ALEX) systems—fire decoys designed to counter inbound enemy anti-ship missiles (ASMs). Mounted onboard the navy's combatant vessels, the decoy launchers, provided by [Lockheed Martin](#), were outfitted with RFID readers from [Aviant Systems](#), and decoy cartridges were fitted with Aviant RFID tags.

The RFID technology offers ship's personnel real-time visibility into which types of decoys are deployed, as well as which barrels they are installed in, and helps ensure that the proper round is fired off, potentially in a split-second decision, while the vessel is under attack. The RFID-enabled automatic round-identification system (ARID) has been successful with that nation's navy, prompting Lockheed Martin to provide the same feature to all of its customers for ALEX systems throughout the world, while also offering to retrofit existing systems with RFID functionality. Purchasers of Lockheed Martin's ALEX system need not buy the RFID system, says Richard Porter, one of the firm's senior engineer, though the company advises that navies do so. "We certainly recommend its use," he says, "It makes the operation of the system much more effective, and ensures adequate system safety."

Most navies currently employ some type of a decoy-launching system, which has been available for many decades. When the ALEX system determines that an anti-ship missile is headed its way, based on cues from shipboard sensors (ESM and/or radar), the decoys are fired accordingly. Decoys deploy material such as chaff—aluminum-coated strands of glass or other material that emit infrared (IR) waves—thus creating false targets to confuse or counter approaching ASMs, and divert them from their intended target. One problem navies face is how to ensure the correct decoy is fired to counter a specific missile threat under battle conditions. Because there are many types of decoy cartridges, all of a similar size and shape, there is a potential for mistakes being made during the process of loading a launcher. Typically, the crew of the combat information center (CIC) room relies on data provided on paper, or over a voice link with the decoy loading crew.

Lockheed Martin worked with Aviant to develop a system that would enable the CIC crew to identify, in real time, the specific decoy in each launcher barrel. The technology was first developed approximately three years ago. At the time, Lockheed Martin sought a system that would automatically identify the type of decoy loaded in each barrel, in order to ensure that the proper decoy was deployed, as well as present the launcher status data on the ALEX system's master control panel.

Each Lockheed Martin decoy launcher (typically two, four or six launchers per combatant, depending on ship size) has a set of six tubes, allowing 12, 24 or 36 decoys per ship to be loaded and fired. Each launcher contains an Aviant low-frequency (LF) 125 kHz RFID reader with six channel options for redundancy. The reader is wired to six antennas, one at the base of each barrel. Naval personnel attach

a small disk-shaped tag, compliant with the ISO 11784/5 standards and encoded with a unique ID number, to the bottom of each decoy cartridge. Sailors can then use a handheld Aviant interrogator to read the tag's ID number and link it to the type of decoy to which that tag is attached. When the tagged cartridge is loaded in the launch barrel, the reader identifies the tag's unique ID number and transmits that information to the ALEX system.

The ARID-enabled ALEX system operates in two modes—fully automatic and semi-automatic—though a manual override option exists at all times. When ALEX receives information regarding inbound threats (a potential threat's bearing and type), ship course and speed, and wind speed and direction, it selects the appropriate response from its database of stored tactics. In the fully automatic mode, the response requires no human interface, and the tactic will be deployed automatically. If the ideal decoy/launch barrel combination is unavailable, the system will utilize ARID to select the next best alternative and automatically deploy that tactic. In the semi-automatic mode, the system will suggest the proper tactics, and the ALEX system operator will be presented with those options and, upon receipt of proper authorization from the ship's commanding officer or his or her representative, make the decision to fire. In manual override mode, the ALEX operator takes control of the system and manually selects the launcher and barrel in order to launch a decoy.

To ensure the RFID system would operate properly in the rigorous environment of a vessel at sea, Lockheed Martin put the Aviant system through heavy testing, Porter says. This included vibration, shock, temperature and moisture exposure, as well as testing for electromagnetic interference (EMI) with other systems on a ship.

"The maritime environment is very rugged, so the testing had to be quite rigorous," Porter says. Lockheed Martin needed the ARID technology to last the lifetime of the ALEX system itself, he adds, and to be able to withstand the ship's highly wet and metallic environment, as well as sustain the shocks of repeated decoy firing. In creating a system capable of meeting these objectives, Aviant's engineers designed the antenna so that the antenna coil is insulated from the metal surface to which the tag is attached. "We're very happy with this system," he states. Lockheed Martin also considered several other technology options, he says, including bar-code labels. However, the company ultimately determined that bar codes would not operate as effectively as RFID in a naval vessel environment.