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New sonar designed to close technology gap

By [Jennifer McDermott](#) Day Staff Writer

Continuous signal promises earlier detection of submarines for surface ships

Mystic - The deadly sinking of a South Korean warship in March made it clear that today's surface ships need a better way to find the diesel-electric submarines being built by potential adversaries.

North Korea still denies any involvement in the incident. But a team of international investigators concluded that it was a North Korean submarine that fired the torpedo that sank the Cheonan in March, killing 46 South Korean sailors.

"The Cheonan was a sitting duck," said U.S. Rep. Joe Courtney, D-2nd District. "Even low-cost submarines by a country that is not a superpower, like North Korea, can do great damage to surface ships because there's a gap in sonar technology."

Alion Science and Technology is attempting to close that gap by developing an improved detection system based on **Continuous Active Sonar** technology. Courtney recently toured Alion's Mystic office.

More than 40 countries operate 600 submarines, including diesel-electric or conventionally powered submarines that are becoming increasingly quiet and more difficult to detect.

China is thought to have 70 submarines either in service or under construction. In 2006, a Chinese submarine came close to the USS Kitty Hawk carrier group without being detected until it surfaced within firing range of the group in the Pacific Ocean.

Conventional sonar on U.S. surface ships, which has been around for decades, transmits a pulsed signal through the water. Sonar operators listen for the echo to return, and the signal is sent out again.

Using Continuous Active Sonar, or CAS, the signal is transmitted constantly and operators listen simultaneously for potential submarine sounds. This technology will enable surface ships to detect submarines quicker, and from a farther distance.

"It's a game-changer in anti-submarine warfare," said JJ Waickwicz, Alion's design, engineering and technology group manager and a retired Navy rear admiral. "It's a leap in technology and in the ability to locate and track submarines."

The country's anti-submarine warfare capabilities have "atrophied," Waickwicz said. There was no longer a perceived undersea threat after the fall of the Soviet Union, and the funding for research and development in this area diminished accordingly.

"We're going to shore that up," Waickwicz said, referring to the acoustic capabilities. "We will become the hunter instead of the hunted."

Alion received \$15 million in 2007 to demonstrate and evaluate the sonar technology. The company expects a follow-on contract from the Navy in fiscal 2011. Twenty people, out of the 80 who work at the Mystic site, are involved with the project as part of a Navy team that

also includes university and Navy laboratories.

The Navy's Program Executive Office for Integrated Warfare Systems evaluated the concept of using CAS for anti-submarine warfare on surface combatants.

The technology has proven its capabilities and will be incorporated into future combat systems for anti-submarine warfare starting in fiscal 2012, according to a statement from that office.

CAS is possible now because of advances in electronics and computer technology, said Kevin Richards, who manages the group of engineers working on it. It can use a smaller transmitter to fit on a variety of ships, including destroyers and littoral combat ships. Surface ships have been the focus for this technology. Submarines often rely on a different form of sonar.

CAS could eventually be adapted to find torpedoes in the water.

"The technology could be used to detect an incoming weapon versus the other way you usually find out," Richards said. "But it would need to be applied to that problem. Torpedoes are much smaller and faster and the timeline is pretty short. The idea is to come up with a system that could be put on a surface combatant to alert them in timely way."

There has been a "heightened interest" in the company's work on torpedo defense since the sinking of the Cheonan in March, Richards said, and some of the nation's allies have expressed an interest in using CAS.

Environmental groups have voiced concerns over the potential effects of active sonar on marine mammals. Richards said that while the issue needs further study, Alion's system may mitigate some of those concerns.

j.mcdermott@theday.com
