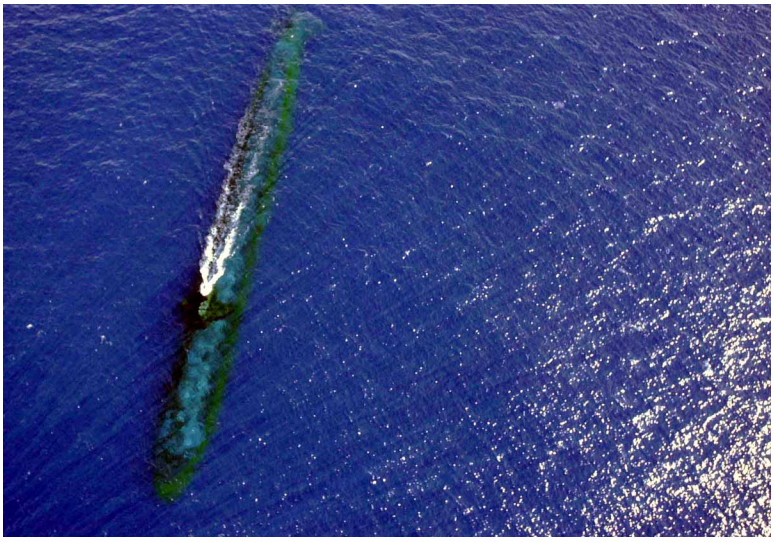
A FUTURE NAVAL CAPABILITY

Littoral Antisubmarine Warfare

The Cold War antisubmarine task was an open ocean one: we faced adversaries who had a large fleet of nuclear submarines supplemented by an even larger fleet of conventional boats. Their goal was to interdict our sea lines of communication and threaten the American homeland with strategic missiles. Tomorrow's antisubmarine task is more complex. The submarine threat we will face confronts our expeditionary forces in the littorals, and the boats that operate there will be small, quiet, nonnuclear submarines. Our ASW forces must counter this more probable threat while they maintain their blue water capabilities.



Why is this Future Naval Capability important? We need an effective and affordable capability to detect, track, classify, and neutralize subsurface systems—not only submarines, but also unmanned underwater vehicles, mining systems, surveillance systems, and systems that foul waters or otherwise seek to deny access—in order to project power ashore. Only then will our forces have full access to the ocean battlespace at the place and time of their choosing.

What's our investment strategy? In developing our core investment program, the Littoral Antisubmarine Warfare FNC IPT focused on identifying and filling capability gaps and fulfilling commitments to funded acquisition programs. Four enabling capabilities will get us there:

- ***First priority.*** We need the ability to detect, classify, localize, and track targets so we can engage them before they get close enough to release their own weapons against us.
- ***Second priority.*** We must be able to characterize the littoral battlespace to provide content for a common tactical and environmental picture.
- ***Third priority.*** We need to be able to rapidly and covertly deploy and sustain surveillance systems for wide area search, detection, and cueing.
- ***Fourth priority.*** We must be able to engage or neutralize bottomed, surfaced, or low Doppler undersea targets beyond their weapon release range.

How are we filling the gaps in those enabling capabilities? Each project has a specific set of milestones and transition opportunities. Technologies will transition to submarines, surface ships, maritime patrol aircraft, ASW helicopters, and wide-area surveillance systems. **First Priority: Detect, classify, localize, and track targets so they can be engaged before they close to weapons release.**

No single sensor works best in all situations, so we will pursue improvements in tactical sensing by reducing the clutter and false contact signals that can confuse active sonar operators, improving passive sonar detection ranges without increasing false alarm rates, and improving the non-acoustic systems' search rate.

- *In FY 2003*: Broadband and environmentally adaptive active sensing algorithms.
- *In FY 2004*: Lightweight multistatic active system deployable by multi-mission helicopters, and an airborne non-acoustic sensing system. Deployment of an acoustic array to develop passive signal processing algorithms.
- *In FY 2005*: Deployable low-frequency multistatic active sensor systems and high frequency broadband transducers for submarine active sonar arrays.
- *In FY 2006*: Compact deployable multistatic receiver, and technology for detection of incoming torpedoes.
- *In FY 2007*: Compact multistatic deployable acoustic source for tactical use, and a robust capability to detect, localize, and classify threat torpedoes.

Transition Opportunities:

· Lightweight Sound System—transition to PMA 299 in FY 04.

· Lightweight Broadband Variable Depth Sonar—transition to DD-21 in FY02.

· Deployable LFA Multistatic source—transition to PMS 415 in FY 05.

· Compact multistatic receiver design—transition to PMA 264, FY 06, with earlier signal processing spin-offs in FY 05.

· Broadband and environmentally adaptive active signal processing algorithms—transition to PMS 411 and DD-21 in FY 02 and FY03.

· Active and passive sensor processing algorithms to detect, classify, and localize incoming torpedoes—transition to PMS 415 in FY 05, FY 06, and FY 07.

· Improved passive sensor processing algorithms—annual transitions to ARCI/APB for submarines and wide-area surveillance systems in FY 02 through FY 07.

Second Priority: Characterize the littoral battlespace to provide content for a common tactical and environmental picture.

A thorough understanding of the environment is essential for the proper deployment and operation of ASW sensor and weapon systems, especially in rapidly changing littoral waters.

· *In FY 2003*: Common Tactical Picture of the undersea battlespace.

· *In FY 2005*: Common Environmental Picture of the undersea battlespace.

· *In FY 2007*: Fused Common Tactical and Environmental Picture that accounts for measurement and model uncertainties.

Transition Opportunities:

· Common Tactical Picture—transition to the Navy's Common Undersea Picture Program in FY 03.

· Common Environmental Picture—transition to the Navy's Common Undersea Picture Program in FY 04 and FY 05.

· Fused Common Tactical/Environmental Picture—transition to APB(T) – XX program (ASTO) in FY 2007.

Third priority: Rapidly and covertly deploy and sustain surveillance systems for wide area search, detection, and cueing.

Affordable technologies for a rapidly deployable and sustainable capability against the high-end undersea threat

· ***In FY 2005:*** Shallow water autonomous nodes arranged in a barrier for detection of quiet submarines.

Transition Opportunities:

· Deployable Autonomous Distributed System technologies—transition to PD-18 in FY 06.

Fourth priority: Engage or neutralize bottomed, surfaced, or low Doppler undersea targets beyond their weapon release range.

We are pursuing new technologies that offer the promise of significant improvements in weapon performance at an affordable cost.

· *In FY 2003*: Torpedo Intelligent Controller, advanced broadband weapon guidance algorithms.

· *In FY 2005:* Improved submarine-to-weapon connectivity technologies.

· *In FY 2007:* Submarine connectivity with multiple weapons and improved torpedo homing performance in littoral waters.

Transition Opportunities:

· Torpedo Intelligent Controller—transition to PMS 404 in FY 04.

· Torpedo broadband active algorithms—transition to PMS 404 in FY 04.

· Torpedo weapon connectivity technologies—transition to PMS 404 in FY 06.

· Torpedo weapon connectivity algorithms—annual transition to ASTO HFSP and Submarine Combat Control in FY 04 through FY 07.

What's some of the sustaining discovery and invention science and technology? Exploitation and delivery depend upon discovery and invention. In ONR's vertically integrated program, we will continue to exploit basic work that proves relevant to littoral antisubmarine warfare.

· ***Advanced materials*** provide the essential building blocks for new, affordable sensor technologies for application in affordable, lightweight, broadband active sonar transducers. Advanced materials are also critical to the development of high endurance, high- energy power sources for long-duration autonomous sensors.

· ***Autonomous control theory*** optimizes sensor system capabilities by facilitating automated environmental adaptation—essential if sensor systems are to cope with the rapid variability of the littoral environment.

· ***Ocean acoustics*** provides the critical link in understanding the effects of the ocean environment on the acoustic signals processed by ASW sensors.

· ***Signal processing*** takes the energy received by the sensors and changes it into information for display to the operator.

· ***Environmental measurement technology*** is needed for accurate *in-situ* measurement of environmental parameters to allow sensor automation and adaptability. The Common Environmental and Tactical Pictures of the undersea battlespace depend heavily on this technology.