



# Atlantic Fleet Training and Testing

## Environmental Impact Statement/ Overseas Environmental Impact Statement



Aug/Sept  
2010

### Importance of Training and Testing Using Active Sonar and Explosives



*Threat nations have made advances in warfare technology. New submarines using advanced batteries and air independent propulsion technologies are extremely quiet and difficult to detect using passive acoustics. Currently, active sonar is the most effective method of detecting these extremely quiet threat submarines.*

#### NEED FOR SONAR TRAINING AND TESTING

More than 400 extremely quiet diesel-electric submarines are operated by more than 40 nations worldwide, and these numbers are growing. The presence of these quiet, difficult to detect submarines presents serious threats to national security, our nation's economic vitality and the safety of our armed forces. As a result, anti-submarine warfare is the "number-one" war-fighting and training priority for U.S. Fleet Forces. The Navy's anti-submarine training and testing activities include the use of active sonar within existing Navy ranges, operating areas and high seas, which prepares and equips Sailors with the technical and tactical expertise they need to counter submarine threats. Additionally, the development of improved anti-submarine detection capabilities and weapons systems is of the utmost importance to the United States. *Continued on back*

#### WHAT IS SONAR?

The use of the term *sonar*, defined as **SO**und **NA**avigation and **R**anging, was coined in 1942 by F.V. Ted Hunt, director of the Harvard Underwater Sound Laboratory. Sonar technology uses sound energy to detect and locate objects under water.

There are two types of sonar: **Passive sonar** is a system that "listens" for sounds generated by human-made or biological sources using underwater microphones that receive, amplify and process underwater sounds. It does not put any sound energy in the water. Passive sonar can indicate the presence, characteristics and directional movement of submarines, but determining distance is time consuming and difficult to perform. Passive sonar can be rendered nearly ineffective when trying to detect today's quiet submarines, especially when operating in the coastal areas. Although improvements in passive sonar are continually being researched and developed, current passive sonar technology does not provide the detection capabilities of active sonar against quiet modern diesel-electric submarines. *Continued on back*

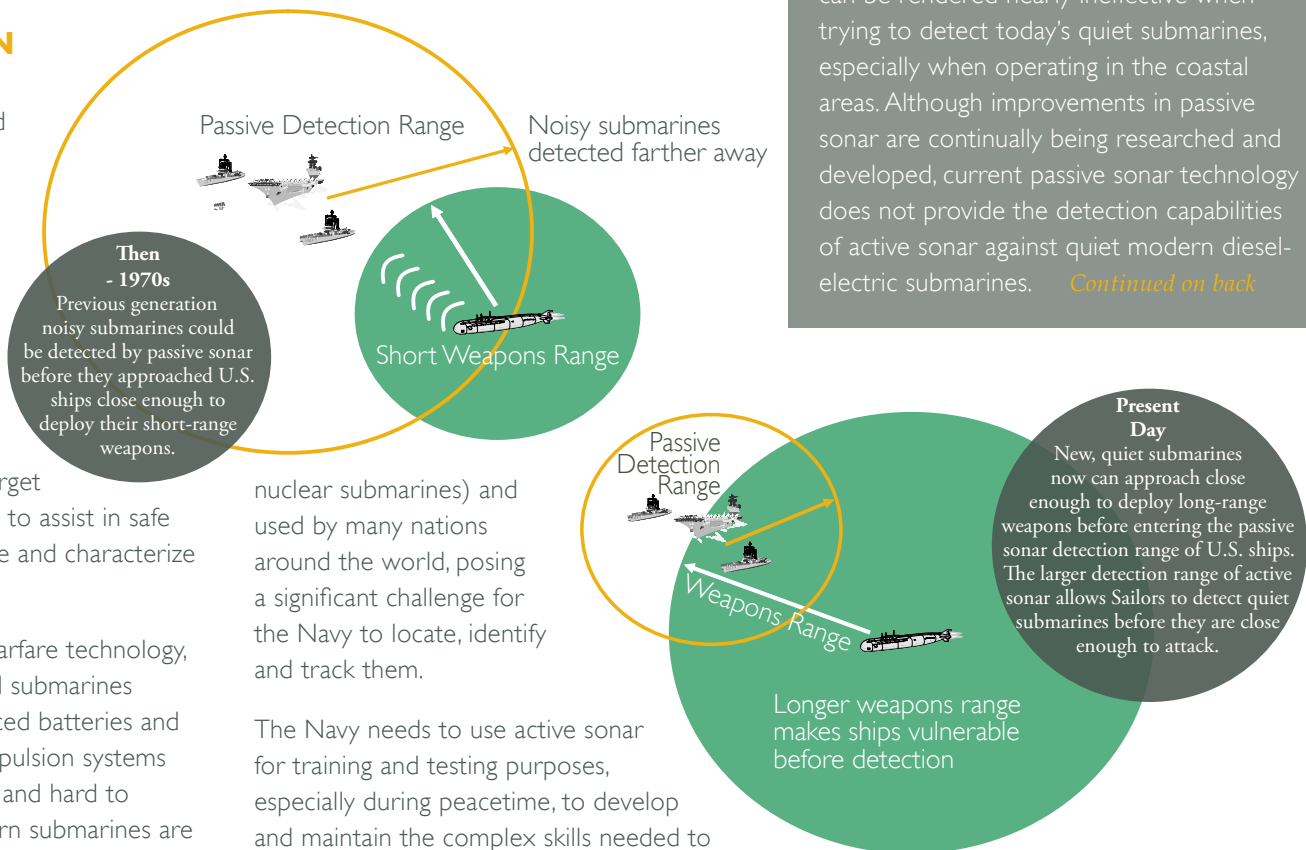
#### SONAR: THEN AND NOW

In response to Allied shipping losses from U-boat attacks during World War I, the Navy began using sonar to locate submerged objects. Today's military sonar is used not only to identify, track and target submarines, but also to assist in safe navigation and locate and characterize underwater mines.

With advances in warfare technology, new diesel-powered submarines operating on advanced batteries and air independent propulsion systems are extremely quiet and hard to detect. These modern submarines are relatively inexpensive (compared to

nuclear submarines) and used by many nations around the world, posing a significant challenge for the Navy to locate, identify and track them.

The Navy needs to use active sonar for training and testing purposes, especially during peacetime, to develop and maintain the complex skills needed to effectively detect and counter these quiet submarines.



**Sonar Training.** The Navy is required by law to ensure Sailors are properly trained. Sonar proficiency demands training in realistic conditions at-sea. The lack of this realistic at-sea training could jeopardize the lives of Sailors and their ships in real-life situations.

**Sonar Testing.** Scientific research, acquisition and maintenance of sonar systems require pierside as well as at-sea testing in order to deliver combat-ready sonar weapons systems capable of locating and countering underwater threats. The acquisition of sonar systems requires scientific research on new and existing sonar systems, and is vital to equipping and maintaining combat-ready Naval forces capable of winning wars, which is required of the Navy by law.

---

**The Navy is requesting reauthorization of its five-year Marine Mammal Protection Act permit, and is required to engage in Endangered Species Act consultations.**

---

## Training and Testing with Explosives

Training with explosives under real-life conditions is essential to the readiness of Sailors who may be called to engage in real-world operations. Operating in a high stress environment – including the use of and exposure to live ordnance and explosives – provides an opportunity for Sailors to practice the critical tasks and coordination essential to survive and succeed in combat. These skills are highly perishable and practice is necessary to ensure accuracy, maintain proficiency and instill confidence in military personnel.

Training with explosives significantly enhances the safety of U.S. forces by improving combat readiness and equipment reliability. To the extent possible, the Navy uses non-explosive practice munitions, simulators and other available technologies when training. Though valuable for initial training requirements, this “simulated” training cannot completely replace training in a real-world environment.

The Navy conducts testing with live ordnance and explosives to determine the reliability of in-service weapons and munitions and to determine the requirement for improvements or modifications. Stringent safety measures to protect military personnel and the environment are rigorously employed during explosives training and testing.

**The U.S. Navy is committed to protecting the marine and coastal environments of the Atlantic and Gulf coasts and the lower Chesapeake Bay, and employs protective measures to mitigate any potential environmental impacts from training and testing activities.**

**Active sonar** is the most effective means available for locating objects under water. It is based on the principle of "echo ranging." Active sonar sends out sound energy, often called a "ping," that travels through water, reflects off objects and returns to an acoustic receiver. Skilled technicians are trained to process the reflected sound and determine the range, distance and movement of the object. Active sonar also has several commercial uses, which include fish finders, ocean bottom mapping and iceberg detection.

Use of active sonar provides the ability to locate objects that are too quiet to be detected using passive sonar technology alone. This makes active sonar invaluable for detecting technologically-advanced, quiet submarines. Active sonar is also the best means to detect mines beneath the water since they typically do not produce sound. The Navy uses active sonar only as necessary to meet training requirements and because sonar can reveal the sending ship's location.

## Training and Testing in a Noisy Environment

Sound levels and how sound travels in the ocean are not constant. They differ in nearly every location of the world and change with time, either hours or years. Different sources of sound contribute to the overall noise level, including shipping, breaking waves, marine life, human-made and other natural sounds. Factors that affect sound propagation include water temperature, water pressure and salinity along with water depth and bottom types.

Coastal waters contain 80 percent of all ocean life and support many human activities, including commercial shipping ports, fishing fleets, and oil exploration and drilling. These activities bring significant noise to the coastal environment, which when combined with complex oceanographic features, creates a difficult and varied environment for sonar technicians to operate within. Coastal waters (within approximately 300 miles of the coast) also present a complex environment of varying depths, coastal boundaries, tides and currents, weather patterns, and significant biological and commercial activities. This complex environment is typically where most nations' submarines operate today.

