

## Aegis Modernization Program

### Executive Summary

- The Navy completed operational testing of Aegis guided missile cruisers (CG-52 through CG-58) upgraded with Aegis Warfare System (AWS) Advanced Capability Build 2008 (ACB08) and Aegis guided missile destroyers (DDG-103 through DDG-112) upgraded with AWS Baseline 7.1R in 1QFY12. The Navy did not scope the ACB08/Baseline 7.1R testing to provide a comprehensive evaluation of effectiveness and suitability. The purpose of these tests was to verify the recent updates did not degrade AWS performance. Based upon operational testing in FY12, the ACB08/Baseline 7.1R AWS performance is consistent with the performance of previous AWS versions, which DOT&E assessed as effective and suitable.
- Operational testing of the ACB08/Baseline 7.1R did not support a full assessment of Aegis effectiveness in the area defense mission. The introduction of AWS Baseline 9 in FY14 introduces new requirements and fields new performance capabilities that are intended to support such an assessment.
- The analysis of test data collected during AWS Baseline 7.1R operational testing and the remaining air defense and suitability portions of AWS ACB08 operational testing is ongoing. DOT&E will issue a formal test report in 2QFY13.

### System

- The Navy's Aegis Modernization program provides updated technology and systems for existing Aegis guided missile cruisers (CG-47) and destroyers (DDG-51). This planned, phased program provides similar technology and systems for new destroyers.
- The AWS, carried on DDG-51 guided missile destroyers and CG-47 guided missile cruisers, integrates the following components:
  - AWS AN/SPY-1 three-dimensional (range, altitude, and azimuth) multi-function radar
  - SQQ-89 Undersea Warfare suite that includes the AN/SQS-53 sonar, SQR-19 passive towed sonar array (DDG-51 through DDG-78, CG-52 through CG-73), and the SH-60B or MH-60R Helicopter (DDG-79 and newer have a hangar to allow the ship to carry and maintain its own helicopter)
  - Close-In Weapon System
  - Five-inch diameter gun
  - Harpoon anti-ship cruise missiles (DDG-51 through DDG-78, CG-52 through CG-73)
  - Vertical Launch System that can launch Tomahawk land-attack missiles, Standard surface-to-air missiles,



Evolved SeaSparrow Missiles, and Vertical Launch Anti-Submarine Rocket missiles

- The AWS on Baseline 2 Aegis guided missile cruisers (CG-52 through CG-58) was upgraded with commercial off-the-shelf hardware running the AWS software ACB08.
- The AWS on new construction Aegis guided missile destroyers (DDG-103 through DDG-112) is Baseline 7.1R.

### Mission

The Joint Force Commander/Strike Group Commander employs AWS-equipped DDG-51 guided missile destroyers and CG-47 guided missile cruisers to:

- Conduct area and self-defense Anti-Air Warfare in defense of the Strike Group
- Conduct Anti-Surface Warfare and Anti-Submarine Warfare
- Conduct Strike Warfare when armed with Tomahawk missiles
- Conduct offensive and defensive warfare operations simultaneously
- Operate independently or with Carrier or Expeditionary Strike Groups, as well as with other joint or coalition partners

### Major Contractors

- General Dynamics Marine Systems Bath Iron Works – Bath, Maine
- Northrop Grumman Shipbuilding – Pascagoula, Mississippi
- Lockheed Martin Maritime Systems and Sensors – Moorestown, New Jersey

# NAVY PROGRAMS

## Activity

- The Navy conducted all portions of the planned operational test of AWS ACB08 in FY10, with the exception of air defense and suitability testing, which it completed in 1QFY12. All testing was conducted in accordance with a DOT&E-approved Test and Evaluation Master Plan and test plan.
- The Navy conducted all portions of the planned operational test of AWS Baseline 7.1R concurrently with the last phase of ACB08 testing in 1QFY12.
- The Navy repaired and examined critical software faults discovered during operational testing of AWS ACB08 in 4QFY12. This testing was conducted in accordance with a DOT&E-approved test plan.
- The Navy continued to deploy AWS ACB08-equipped cruisers and AWS Baseline 7.1R-equipped destroyers in FY12 in advance of operational testing.
- The Navy is preparing an update to the Test and Evaluation Master Plan to incorporate AWS baseline ACB 2012 (ACB12). ACB12 will provide existing and new construction Aegis destroyers an Integrated Air and Missile Defense (IAMD) capability that includes Ballistic Missile Defense (BMD). Current plans will also provide an enhanced Air Defense capability to selected Aegis cruisers without BMD (CGs-59, -60, -62, and -71).

## Assessment

- The Navy did not scope the ACB08/Baseline 7.1R testing to provide a comprehensive evaluation of effectiveness and suitability. The purpose of these tests was to verify that the recent updates did not degrade AWS performance. Based upon operational testing in FY12, the ACB08/Baseline 7.1R AWS performance is consistent with the performance of previous AWS versions, which DOT&E assessed as effective and suitable. Analysis of the test data indicates the following:
  - The Air Warfare performance of Aegis cruisers and destroyers, in self-defense posture, is consistent with that

of ships with earlier Aegis baselines. Testing did not focus on the area defense capability of the ACB08/7.1R AWS. The Navy intends to conduct an assessment of area defense effectiveness with the introduction of ACB12/AWS Baseline 9 in FY14.

- The Undersea Warfare performance of Aegis cruisers with AWS ACB08 is consistent with that of ships with earlier Aegis baselines.
- The Surface Warfare performance of Aegis cruisers and destroyers is consistent with that of ships with earlier Aegis baselines. As previously assessed, Aegis ships have limited ability to counter high-speed surface threats in littoral waters.
- Operational testing of ACB08/Baseline 7.1R in a multi-ship, Cooperative Engagement Capability environment revealed shortcomings in crew proficiency and training not observed in earlier testing that adversely affected Air Warfare performance.
- The analysis of data collected during follow-on testing of AWS ACB08 is still in progress. DOT&E will report on the corrective action in the ACB08 test report in 2QFY13.

## Recommendations

- Status of Previous Recommendations. The Navy satisfactorily completed all FY11 recommendations.
- FY12 Recommendations. The Navy should:
  1. Continue to improve Aegis ships' capability to counter high-speed surface threats in littoral waters.
  2. Synchronize future baseline operational testing and reporting with intended ship-deployment schedules to ensure that testing and reporting is completed prior to deployment.
  3. Ensure Aegis crews are proficient in operation of the AWS when in a multi-ship, network environment.