DDG 51 Guided Missile Destroyer

Executive Summary
- DDG 51 is operationally effective in open ocean battle space, which is their designed operating environment.
- DDG 51 is less effective and at greater risk in the littoral waters where it may encounter asymmetric, high-speed surface threats.
- The latest Aegis Weapons System software releases have reliability and maintainability problems.

System
- The DDG 51 Guided Missile Destroyer is a combatant ship equipped with:
  - The AEGIS Weapons System (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, and the SH-60B or MH-60R Helicopter (DDG 79 and newer have a hanger to allow the ship to carry and maintain its own helicopter)
  - Five-inch gun
  - Harpoon anti-ship cruise missiles
  - The Vertical Launch System that can launch Tomahawk land attack missiles, standard surface-to-air missiles, Evolved Sea Sparrow Missiles, and Vertical Launch Anti-Submarine Rocket missiles

Mission

The Maritime Component commander can employ DDG 51 to:
- Conduct Anti-Air Warfare, Anti-Surface Warfare, and Anti-Submarine Warfare

- Conduct land attack warfare when armed with Tomahawk missiles
- Conduct offensive and defensive warfare operations simultaneously when necessary
- Operate independently and with Carrier or Expeditionary Strike Groups as well as with other Joint or Coalition partners

Activity
- Follow-on operational testing and evaluation of ships with AWS Baseline 6.3 software installed (hulls 79-90) began May 2004 and concluded March 2005.
- Testing consisted of:
  - Maintenance demonstration
  - Interoperability testing in conjunction with a multi-ship missile firing exercise
  - Undersea and surface warfare testing
  - Air defense testing
- Testing of Baseline 7.1 AWS (hulls 91-102) equipped ships commenced and will continue into FY06.

Assessment
- Operational testing was adequate and conducted in accordance with DOT&E-approved test plans. However:
  - One air threat could not be adequately represented with the Navy's current inventory of targets.
  - Undersea warfare exercises were cut short after the participating submarine was reassigned to other operational duties.
- Ships with AWS Baseline 6.3 software are operationally effective in an open ocean environment but not in littoral waters close to land where they are susceptible to certain

surface threats. This was also noted for ships with Baseline 5.3.8 software.
- Ships with AWS Baseline 6.3 software are not operationally suitable due to several software reliability and maintainability problems. These included a very short time between rebooting, poor technical documentation, and numerous workarounds that proved distracting to operators.
- Baseline 7.1 testing started with more high priority software anomalies on record than the number on record at the start of baseline 6.3 testing. None specifically cause safety hazards or interfere with the operation of the AWS. However, collectively these anomalies cause operators to be less efficient and to apply workarounds. Future software baselines (7.1R and 7.1OA for cruisers) are in development with a high level of program office attention to issues that might affect readiness for fleet release.
- The currently approved Test and Evaluation Master Plan (TEMP) does not include details or funding to assess upcoming baselines that will modify AWS system performance and operation.

Recommendations

The Navy should:

1. Complete testing of the Baseline 7.1 ships. Ensure suitability issues with Baseline 6.3 software are resolved through follow-on testing.
2. Update the DDG 51 TEMP to provide funding for testing of future Baselines (7.1R, 7.1OA).
3. Consider consolidating DDG 51/AWS with SPY-1(D)V and SQQ-89(V)15 programs under a single TEMP. All of these programs are dependent on DDG 51. Consolidation will maximize developmental and testing efficiencies. These systems may be good candidates for later inclusion in the Navy's proposed Anti-Air Warfare Self Defense Enterprise Strategy.
4. Consider including CG 52 class cruisers with the DDG 51, perhaps as a broader program. AWS Baselines installed are very similar for the cruisers and destroyers. Should the Navy fund a cruiser modification program that significantly enhances capability, it could realize development and testing efficiencies.