

## SURFACE WARSHIPS

### CG-47 *Ticonderoga* Class Aegis Guided Missile Cruiser Conversion Program

**Description:** The 27 *Ticonderoga* (CG-47)-class guided missile cruisers have combat systems centered on the *AEGLIS* Weapon System and the SPY-1 multi-function, phased-array radar. The *Ticonderoga* class' combat system includes the Standard Missile (SM-2), unparalleled air warfare systems, advanced anti-submarine and anti-surface warfare systems, embarked sea-control helicopters, and robust command-control-and-communications systems in a potent, multi-mission warship. In addition, 22 of the 27 cruisers are equipped with the Mk 41 Vertical Launching System (VLS), giving them a significant land-attack/strike capability with the *Tomahawk* Land-Attack cruise Missile (TLAM) and, in the future, the Advanced Land Attack Missile (ALAM). *Ticonderoga*-class cruisers provide multi-mission offensive and defensive capabilities, and operate independently or as part of carrier battle groups, surface action groups, amphibious ready groups, and underway replenishment groups.



Beginning in Fiscal Year 2006, after incorporating new mission capabilities as part of the Cruiser Conversion Program (a mid-life warfighting capability upgrade currently planned for all 27 cruisers), these warships will provide defense against ballistic missiles, as well as enhanced land-attack and area air-defense capabilities. The Cruiser Conversion warfighting improvements will extend the *AEGLIS* combat system's capabilities against projected threats well into the 21st century.

**Program Status:** The 27 *AEGLIS* cruisers (CGs 47-73) are planned for conversion beginning in Fiscal Year 2006.

**Developer/Manufacturer:** Ingalls Shipbuilding, Pascagoula, Mississippi, and Lockheed Martin, Moorestown, New Jersey.

### DDG-51 *Arleigh Burke* Class AEGIS Guided Missile Destroyer



**Description:** The state-of-the-art DDG-51 guided missile destroyers have combat systems centered on the *AEGLIS* Weapon System and the SPY-1D multi-function, phased-array radar. The *Arleigh Burkes*' combat system includes the Mk 41 Vertical Launching System (VLS), an advanced anti-submarine warfare system, advanced anti-air warfare missiles, and *Tomahawk* cruise missiles. Incorporating all-steel construction and gas-turbine propulsion, DDG-51 destroyers provide multi-mission offensive and defensive capabilities, and can operate independently or as part of carrier battle groups, surface action groups, amphibious ready groups, and underway replenishment groups. The Flight IIA variant incorporates facilities to support two embarked helicopters, significantly enhancing the ship's sea-control capabilities.

**Program Status:** Thirty-four *Arleigh Burke* class destroyers have been delivered through Fiscal Year 2001, and 20 others are planned for delivery through FY 2007. The first Flight IIA destroyer, *Oscar Austin* (DDG-79), which includes a hangar facility for two embarked helicopters, was commissioned in August 2000. The first destroyer with the 5-inch/62 caliber gun, *Winston S. Churchill* (DDG-81), was commissioned in 2001.

The SPY-1D(V), an upgrade to the SPY-1 family of radars, successfully underwent the first phase of testing in 1996. This improved radar will keep these



ships ahead of the emerging low-observable anti-ship cruise missile threat in the cluttered littoral operating environment. The improved SPY-1D(V) radar, as well as advanced architecture combat systems using commercially developed processors and display equipment, will be introduced in DDG-91. The Navy is injecting "SmartShip" technologies and systems into the DDG-51 shipbuilding program, in both forward and back-fit installations, at the earliest opportunities, and in 2001 initiated a class "optimal manning" study to assess ways in which to reduce crew size. Not only will such technology-insertion ensure that these warships keep abreast of the threat, it will help to reduce manning and contribute significantly to lowering total ownership costs. This is an important consideration, as much as 60 percent of a warship's total lifecycle costs are currently attributed to its crew.

**Developer/Manufacturer:** Bath Iron Works, Bath, Maine; Ingalls Shipbuilding, Pascagoula, Mississippi; and Lockheed Martin, Moorestown, New Jersey.

## DDX

### Future Surface Warship Program



**Description:** In light of the Defense Planning Guidance and the results of the 2001 Quadrennial Defense Review, and in conjunction with the Navy's recognition of the transformational imperatives of the future, the Navy determined that some revision to the development plan of future surface warships was in order. A family of surface combatants will be required to meet future warfighting requirements—not just a single ship class. Winning the fight requires the ability to conduct assured access and maneuver warfare. The DDX represents the first of this family of ships designed to fight and win in any maritime environment. As the precision strike and volume-fires provider of the family, DDX will be armed with an array of land-attack weapons, including the Advanced Land-Attack Missile (ALAM), Tactical

*Tomahawk* (TACTOM), and the Advanced Gun System (AGS) firing Long-Range Land-Attack Projectiles (LRLAP). (See separate program summaries.) DDX will provide sustained, offensive, distributed, and precise firepower at long ranges to support forces ashore and to conduct independent attacks against land targets. With state-of-the-art network-centric information technologies, DDX will operate seamlessly with other naval, ground, and land-based air forces. The DDX program's emphasis on "sensor-to-shooter" connectivity will provide a naval or Joint Task Force commander with the multi-mission flexibility to destroy a wide variety of land targets while simultaneously countering maritime threats. Moreover, DDX will take advantage of advanced stealth technologies rendering it significantly less detectable to potential adversaries and more survivable to enemy attack than the ships the class will replace.

DDX will feature an Integrated Power System to provide power for advanced propulsion systems as well as combat systems and hotel loads. Additionally, an open architecture distributed combat system will support a "plug and play" environment in which to operate AGS, an advanced vertical launching system and a Multi-Function Radar/Volume Search Radar suite. Other features on DDX will include an advanced hull form, integrated electric drive propulsion, optimal manning based on comprehensive human-systems integration and human-factors engineering studies, extensive automation, advanced apertures, and dramatic reductions across the entire spectrum of signatures (radar, acoustic, magnetic and infrared). In order to validate these technologies, DDX will implement a "spiral-design" review process, ensuring that each of these breakthrough technologies responds to future operational requirements. Once validated for the precision-strike and volume-fires DDX variant, these technologies will also be incorporated in other members of the DDX family of ships, including a CGX next-generation cruiser and a Littoral Combat Ship (LCS).

**Program Status:** DDX will employ a spiral acquisition development strategy focused on research and development and technology insertion across a broader spectrum of future naval ships. On 12 January 1998, the Under Secretary of Defense for Acquisition and Technology signed an Acquisition Decision Memorandum, approving Program Definition and Requirements Review (Phase I) for the *Zumwalt*-class DD-21. In August 1998, the Navy awarded an agreement for two competing industry teams to conduct requirements analyses and trade-off studies and to develop initial system concept designs. A DD-21 program review in September 1999 and a Systems Functional Review in July 2000 indicated the two industry teams were on track and making significant progress in development of their competing ship designs. Down-selection to a single design and "Full Service Contractor" was planned for spring 2001, but was delayed in May 2001 to allow time to determine if a change in program strategy was warranted based upon the outcome of the 2001 QDR, defense strategy reviews, and an OSD shipbuilding study.

**Developer/Manufacturer:** To be determined. The two conceptual-development teams are: Blue Team (Bath Iron Works, Bath Maine; and Lockheed Martin, Moorestown, New Jersey), and Gold Team (Northrop Grumman Ingalls Shipbuilding, Pascagoula, Mississippi; and Raytheon Systems, Inc., Sudbury, Massachusetts).

## SDTS

### Self Defense Test Ship

**Description:** The ex-*USS Decatur* serves as the Self-Defense Test Ship (SDTS), and is the primary means of at-sea testing for weapon systems elements. Remotely controlled and unmanned, the SDTS has been part of testing for all ship self defense protection system elements since 1995 and remains the only means of at sea testing in a realistic environment. The tests on board the SDTS are conducted on the Point Mugu test range off the coast of Southern California. Current systems on the SDTS include the Rolling Airframe Missile (RAM), *Phalanx* Close-In Weapon System (CIWS), Ship Self Defense System (SSDS), Rearchitected NATO *Seasparrow* Missile System (RNSSMS), and Evolved *Sea Sparrow* Missile (ESSM).



**Program Status:** The current SDTS will cease satisfying the requirement for realistic element testing at the end of FY 2004. Four studies were conducted validating the requirement for the SDTS follow-on. To meet this requirement, the Navy has designated the *USS Paul F. Foster* (DD-964), with its four gas turbine generators and 10,000-kilowatt capacity, as the SDTS follow-on. The ex-*Decatur* will be phased out by the end of FY 2004, and *Paul F. Foster* will IOC as the next SDTS in FY 2005.

**Developer/Manufacturer:** To be determined.



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