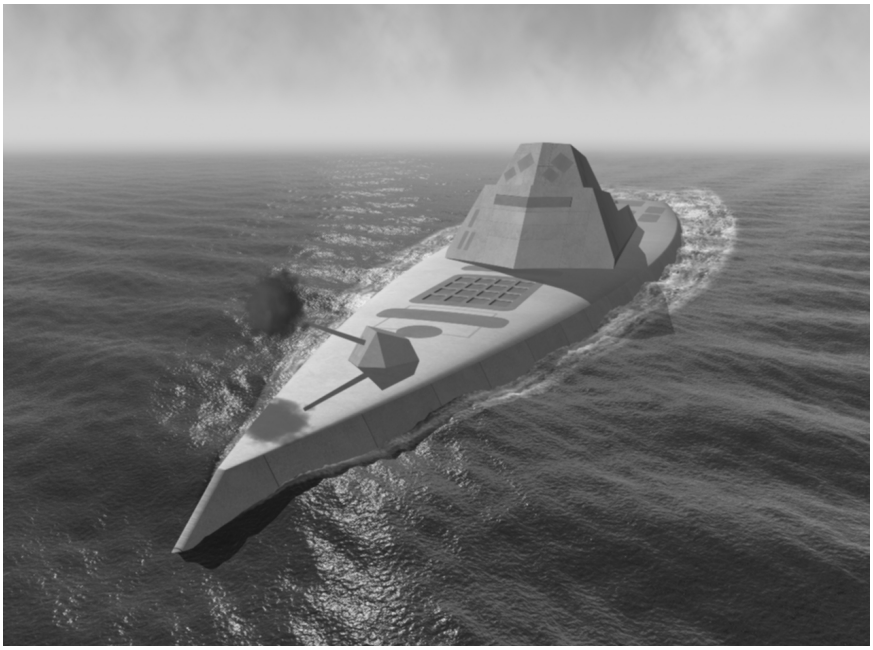
LAND ATTACK DESTROYER (DD 21)



Navy ACAT ID Program		**Prime Contractor**
Total Number of Systems:	32	TBD
Total Program Cost (TY$):	$50,304.9M	
Average Unit Cost (TY$):	$1,359.4M	
Full-rate production:	2QFY13	

SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2020

The Land Attack Destroyer (DD 21) is the first in a family of Twenty First Century Surface Combatants (SC 21). It will provide independent forward presence/deterrence and operate as an integral part of Naval, Joint, and Combined maritime forces. Tailored for land attack, DD 21's mission is to carry the war to the enemy through offensive operations. It will contribute to ***Joint Vision 2020*** through ***precision engagement*** and ***dominant maneuver*** by conducting littoral operations that include firepower support for amphibious and other ground forces and the launch of precision strike weapons. DD 21 will also provide friendly forces ***full dimensional protection*** from enemy attack through the establishment and maintenance of surface and undersea superiority and local air defense. Signature reduction is to be incorporated into the DD 21 design, allowing it to operate in all threat environments. DD 21 is the numerical replacement for retiring Spruance (DD 963) class destroyers and Oliver Hazard Perry (FFG 7) class frigates, which will reach end of service life during the 2005-2007 timeframe.

In early FY00, the Navy announced that DD 21 will be powered by electric drive and will feature an integrated power system. The integrated power system design will allow sharing of electrical power between propulsion motors and other uses. Another identified DD 21 feature is the Advanced Gun System, which will meet land attack and surface mission requirements. Each Advanced Gun System will consist of a single-barrel 155mm gun supplied by an automated magazine that will carry a family of long-range land attack and surface projectiles.

BACKGROUND INFORMATION

During Phase I of the acquisition strategy, which concluded in October 1999, two industry teams performed requirements analyses and trade studies to develop competing DD 21 system concept designs. In November 2000, the competing teams delivered DD 21 system preliminary designs and Smart Product Models that include virtual prototypes of the DD 21 system. The government will select a single design at the end of Phase II. After downselect, the winning Full Service Contractor will complete the DD 21 design; build (at both competing shipyards), conduct DT, deliver DD 21 and provide life-cycle support.

During 4QFY98, DD 21 LFT&E performed a successful Weapon Effects Test against ex-USS RICHMOND K. TURNER (CG 20). The objectives of the this test were to generate weapon effects data needed for the improvement and validation of damage models and to demonstrate real threat weapon damage on Navy ships to industry designers. Weapon effects data collected from this test will be used to validate damage models, which will be used for the design and vulnerability assessment of DD 21. The post-test exhibition and documentation of the damage provided a valuable data base for the survivability design of DD 21.

DOT&E approved both the Milestone I TEMP in FY98 and Change 1, which included an updated LFT&E strategy, in FY99.

TEST & EVALUATION ACTIVITY

DOT&E participated in the DD 21 Test and Evaluation Working Integrated Product Team throughout FY00 and attended the competing industry team's program reviews. DOT&E reviewed industry team test and evaluation documents and provided assessments of their adequacy to the Program Manager. DOT&E assisted the Program Manager and OPTEVFOR with preparation of the first major TEMP revision, which incorporates revised OT and LFT&E strategies as well as schedule adjustments (Milestone II in 1QFY04 and IOC in 2QFY11) and funding re-alignment to reflect POM 02 inputs and accommodate advanced procurement budgeting. The revised TEMP was approved by DOT&E in September 2000, with the requirement to complete another revision of the TEMP within six months after the March 2001 downselection to one Full Service Contractor. DOT&E also assisted the Program Manager in developing Change 1 to the LFT&E Management Plan, which was approved in July 2000.

The DD 21 Program completed two significant LFT&E testing efforts during FY00. The ex-USS DALE (CG 19) was used for an advanced weapons effects test to collect data on ballistic damage that results when a missile impacts a ship. This test program represents the most extensive data collection effort ever conducted for missile attacks against actual ship structure. At DOT&E's suggestion, the Navy included combustible material in some of the attacked spaces for one of the two tests. The test confirmed the devastating effects of weapons-induced fires and the significant impact on crew access and fire spread caused by door, sheet metal structure, and escape trunk failures and fire and blast propagation through ventilation systems. Another testing effort, part of the Navy's Magazine Protection work, examined the reaction propagation behavior and internal blast yield of large missile booster motors when directly and indirectly attacked by weapons effects. In addition, DOT&E/LFT&E senior leadership has provided both Blue and Gold Team senior leadership with LFT&E tutorial and dialogue.

TEST & EVALUATION ASSESSMENT

After the March 2001 downselect, the first of two EOAs will be conducted to provide the first in-depth look at the potential effectiveness and suitability of the winning design. The EOAs will be performed by a team comprised of subject matter experts from Navy Systems Commands, the Naval Surface Warfare Center and user representatives from OPTEVFOR, MCOTEA, and the fleet. This team will apply its wealth of experience in a thorough review of program documentation, modeling and simulation results, and data from technical and developmental testing. The second EOA will be conducted in FY03 to update the assessment prior to Milestone II.

In a significant departure from operational testing of earlier combatants, the revised TEMP introduces a two-phase operational evaluation of the first ship that will span a period of more than one year and draw data from the lead ship's first operational deployment. DOT&E supports OPTEVFOR's assessment that DD 21's advanced technologies, reduced manning, and unique Full Service Contractor support concept warrant an extended examination of DD 21 operations and logistics support. However, the extended OPEVAL concept will require further clarification in the next TEMP revision to ensure operational testing is adequate to support an independent assessment of operational effectiveness and suitability prior to the lead ship's first deployment. The next TEMP revision must also provide greater detail in Part V, specifically laying out resources to support DT and OT of industry's system design.

The Navy's LFT&E program for DD 21 is using a combination of surrogate tests, component and system tests, a Shock Trial, a Total Ship Survivability Trial, and modeling and simulation to assess the vulnerability of DD 21 to threats likely to be encountered during combat. The modeling and simulation effort will be calibrated by the results of the various tests, as well as previous combat incidents, to assess the vulnerability of DD 21 in damage scenarios reflecting realistic threat encounters. The Navy will develop a series of Vulnerability Assessment Reports keyed to the various stages of ship design and construction to report the results of their LFT&E effort.

CONCLUSIONS, RECOMMENDATIONS AND LESSONS LEARNED

The Navy and the winning industry team must fully address LFT&E requirements as part of their integrated test program. Additionally, the winning industry team must make a commitment to robust testing of surrogates to address fire spread and develop the ability to extrapolate shock trial results to realistic encounter conditions for underwater explosions. DOT&E is also concerned about the Navy's difficulty in completing the evaluation of testing efforts in a timely manner. The reports for both the CG 19 weapons effects test and the missile booster motor test are many months overdue. Without the test reports, these key testing efforts are not fully contributing to the design of DD 21. The Milestone I Vulnerability Assessment Report discussed in last year's annual report is two years overdue.

The DD 21 Program has established a solid framework for T&E, but a more focused T&E effort must begin in earnest following selection of a Full Service Contractor design in FY01. At that time industry will assume a much larger role in DT&E planning and execution. The next TEMP revision required six months after downselect will be a combined Government and Full Service Contractor development effort. That TEMP revision must provide a clear T&E roadmap and show that the T&E program will produce the data necessary to support an informed Milestone II decision. TEMPs delivered to date have fallen short of that objective. As part of the TEMP revision effort, COMOPTEVFOR requested that the Chief of Naval Operations provide threshold parameters for key DD 21 enabling technologies including the Advanced Gun System, Long-Range Land Attack Projectile, Multi-Function/Volume Search Radar suite, and the Integrated Propulsion System. DOT&E strongly supports

the high level of early OT community and user involvement associated with the EOAs that will be conducted in FY02 and FY03. These critically important evaluations will provide early opportunities to identify and correct any significant shortcomings in the DD 21 design, which should reduce the requirement for costly changes during the construction process.