



DDG 1000 Class Destroyer



DDG 1000 December 2015



DDG 1001 October 2015



DDG 1002 October 2015

DDG 1000 Overview

14 January 2015

*Surface Navy Association (SNA)
27th National Symposium*



DDG 1000 Program Manager, PMS 500

RDML(s) Jim Downey



DDG 1000 / 1001

October 2015

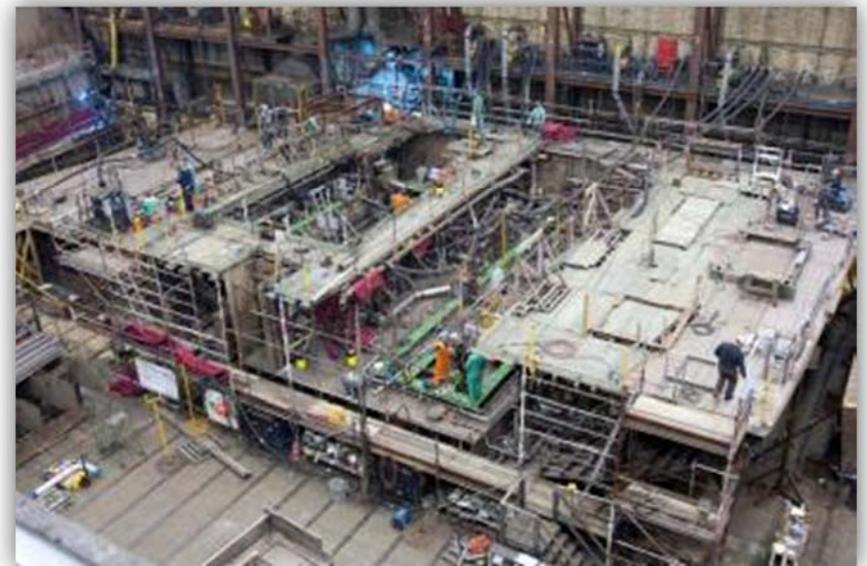




DDG 1002 PRE-FABRICATION UNITS



OCTOBER 2015





DDG 1000 Program Highlights



- **Started DDG 1000 fabrication February 2009 – 98% complete (as of 06 Jan 2016; ~600 of 340,000 work orders remain; test 83% complete)**
 - Resulting in full ship (15,000 tons, 610 ft long)
 - Hangar arrived May 2012 at BIW and erected Jul 2012
 - Deckhouse arrived Nov 2012 at BIW and erected Dec 2012
 - Launch – 28 Oct 2013
 - Christening – 12 Apr 2014
 - **Test and Activation underway (Alpha Trials conducted 7-13 Dec 2015)**
- **Started DDG 1001 fabrication March 2010 – 84% complete (as of 06 Jan 2016)**
 - All units are on Land Level Transfer Facility (LLTF) at BIW
 - Keel Laying 23 May 2013
 - Hangar arrived Oct 2013 at BIW
 - Deckhouse arrived Sep 2014 at BIW and erected Nov 2014
- **Started DDG 1002 fabrication 4 April 2012 – 43% complete (as of 06 Jan 2016)**
 - Fabrication underway – 29% complete
 - Material at 58% complete
 - Steel deckhouse / hangar design complete, production underway
- **Integrated Power System (IPS) provides complete electric plant integration**
 - Full Power (local control) completed May 2011
 - IPS with Engineering Control System (ECS) completed March 2012
 - Energized High Voltage Sep 2013
 - Risk reduction testing complete at Philadelphia Land Based Test Site (LBTS); transitioning equipment FY15-16 to DDG 1002
 - IPS thoroughly exercised at sea 7-13 Dec 2015; IFTP very stable



DDG 1000 Dec 2015



DDG 1001 May 2015



DDG 1000 Program Highlights (Cont')



- **100% of Mission Systems Equipment (MSE) delivery complete and installed on DDG 1000 and 1001**
 - Equipment delivered in time to meet ship activation requirement
 - DDG 1002 MSE contract awarded 31 Dec 2015
- **SPY-3 with integrated volume search**
 - Testing of X-Band Mods for Volume Search at Wallops Island underway, then Self Defense Test Ship
- **Software development progressing to support ship activation and delivery**
 - Software Releases (SR) 1-7 completed
 - Release 8 development complete; final acceptance testing and documentation on track to complete in 2QFY16
- **Advanced Gun System (AGS) manufacturing underway at 3 facilities (Cordova, AL; Fridley, MN; and Louisville, KY)**
 - 1st Ship AGS magazines and guns delivered early to BIW; MT61 and MT62 installed
 - 2nd Ship magazine installation complete
 - Testing of 1st AGS gun at Dugway Proving Grounds, UT completed
 - All 3 Ship sets under contract
- **Long Range Land Attack Projectile (LRLAP) development and testing**
 - Guided flight tests (GFT) successfully completed Oct 2013
 - Demonstrated max range capability
 - Demonstrated outstanding accuracy
 - Demonstrated Height-of-Burst (HOB) operation with excellent lethality
 - Rocket motor redesign complete including hot/cold/ambient static fire tests
 - Transition to production in progress to support Low Rate Initial Production (LRIP) in 2QFY16





DDG 1000 Requirements



- Carry the fight to the enemy through offensive operations and destroy enemy targets ashore with precision strike and volume fires
- Contribute to littoral dominance: surface, air, sub-surface
- Employ an open architecture total ship computing approach
- Be highly survivable
- Reduce crew size

Requirements Document

- DD(X) Operational Requirements Document, Change 1 approved, dated Jan 2006
- DD(X) will transition from a single step to full capability approach to a spiral acquisition
 - Spiral acquisition fields operationally and supportable capability in as short a time as possible, with the explicit intent of delivering improved or updated capability in the future
- Acquisition Risk Mitigated thru spiral development, modeling & simulation, and a combination of land-based / at-sea testing

<u>Key Performance Parameters</u>	<u>Threshold</u>	<u>Objective</u>
Interoperability Top Level IERs	2	All IERs
Number of Guns	2	2
Gun Magazine Capacity	600	1200
Vertical Launch Cells	80	128
Radar Cross Section	175	125
Manning	175	125
Survivability (5)		
Force Protection (2)		

Designed to meet all requirements; Evolutionary Acquisition – Spiral Development



DDG 1000 Characteristics



Hull

Wave-Piercing Tumblehome

Characteristics

Overall Length 610 ft

Displacement Full Load 15,612 LT

Maximum Beam 80.7 ft

Installed Power 78 MW

Navigational Draft 27.6 ft

Crew Size 147

Speed 30 kts

(plus 28 person aviation detachment)

Sensors

SPY-3 X-Band

Multi-Function Radar (MFR)

Volume Search Radar (VSR) (Space & Weight Reservation)

HF & MF Bow Sonar Arrays

Multi-Function Towed Array

EO/IR System

ES System

EXCOMMS – Alternative Navy C4I POR

Integrated Power System (IPS)

(2) Main Turbine Generators (MTG)

(2) Auxiliary Turbine Generators (ATG)

(2) 34.6 MW Advanced Induction Motors

Weapons

(80) Advanced Vertical Launch (AVLS) cells for Tomahawk, ESSM, Standard Missile

(2) Advanced Gun System (AGS) 155 mm guns

(600) 155 mm rounds

(2) MK 46 Close In Guns Systems (CIGS)

Torpedo Defense (Space Reservation)

Anti-Terrorism

Superstructure

Composite Structure

– DDG 1000 / 1001

Steel

– DDG 1002

Boats

(2) 11m or 7m RHIBs

Aviation

(1) MH60R and (3) VTUAVs /

(2) MH 60Rs



DDG 1000 Critical Technologies

Engineering Development Models (EDMs) Used to Mitigate Production Risk Prior to Milestone B Decision



Dual Band Radar (DBR)



- MFR (X Band) at sea-based testing complete
- VSR (S Band) land based testing complete
- Leap ahead clutter rejection capability in the littorals
- MFR Volume Search modification complete
- MFR Testing underway
 - Wallops (2015-2016)
 - SDTS (2016-2017)
 - DDG 1000 (2016-2018)

Composite Deckhouse & Apertures Test Article

- Composite production ability proven
- Tested for RCS and EMI
- Validated RCS KPP can be achieved



Advanced Gun System (AGS)/Long Range Land Attack Projectile (LRLAP)

- Full scale Gun and Magazine produced
- Automated Magazine and Gun rate of fire validated
- Tactical Rocket Motor design demonstrated at threshold 63 NM range
- LRLAP Tactical Guided Flight Tests completed Oct 2013
 - LRIP Q2FY16



Peripheral Vertical Launch System (PVLS) / Advanced VLS

- Detonation tests and missile restrained firing testing complete
- Enhanced survivability design proven and ability to carry all current missiles (SM 2/3/6, ESSM, VLA with CEU mods)



Integrated Power System (IPS)



- Full scale testing of components
- Full rated power and torque validated
- Full Power testing completed
- ECS LBTS testing completed
- HM&E Activation Underway
 - Energized High Voltage Sep 2013
 - AIM light off Jul 2014
 - Generator light off Sep 2014
 - SAC Nov 2014
 - Alpha Trials Dec 2015



Total Ship Computing Environment (TSCE)

- Software Releases 1-7 complete
- Open Architecture principles applied
- R8 available in 2QFY16
 - Development complete
 - Final acceptance testing and documentation on track to complete 2QFY16



Hull Form Scale Models

- Sea keeping, stability and RCS performance validated by model testing
- Underwater explosion testing complete – hull whipping requirement validated
- Hull form certification underway
- Cert / Guidance for Trials received in 2014; Heavy Weather Guidance received June 2015
 - Ship performed well during sea trials in Dec 2015

Integrated Undersea Warfare (IUSW)

- At-sea mine avoidance capability proven
- Reduced ASW manning validated



Autonomic Fire Suppression System (AFSS)

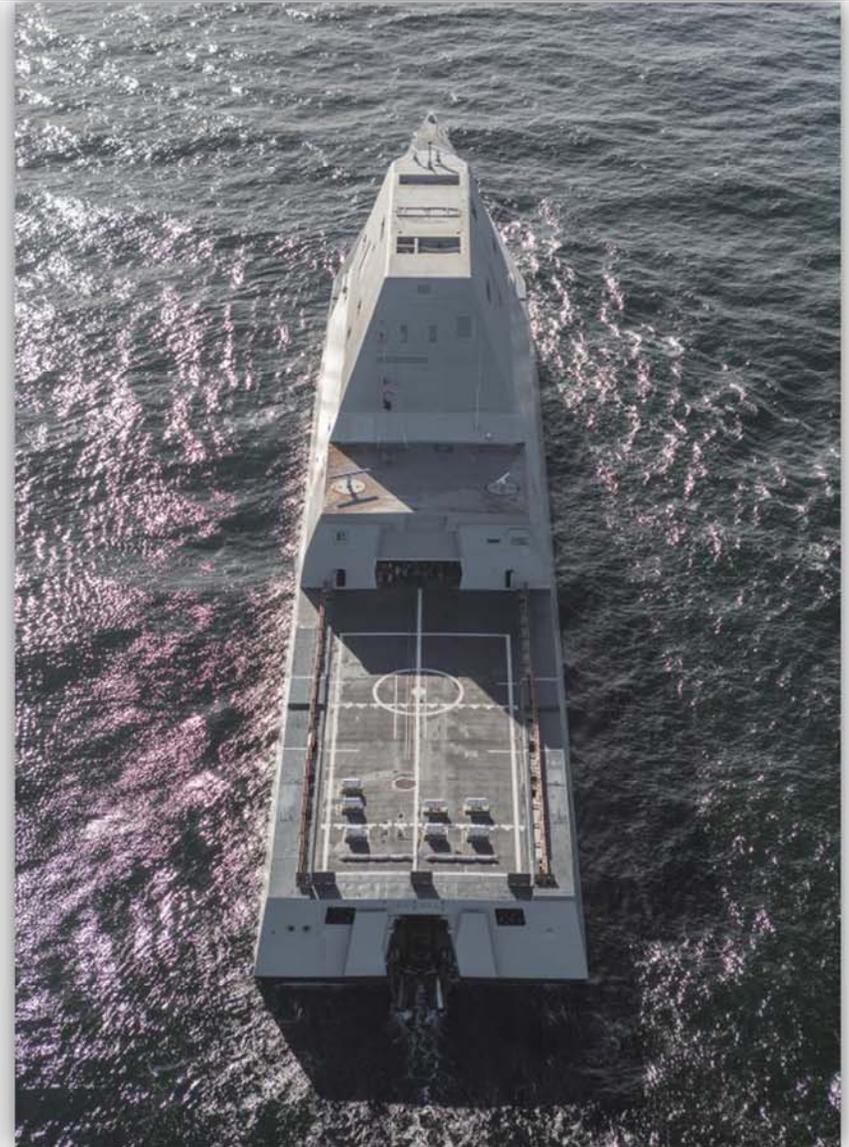
- At-sea weapons effect autonomic fire suppression testing demonstrated
- Critical technology enables reduced manning





DDG 1000 SEA TRIALS

DECEMBER 2015





DDG 1000 SEA TRIALS DECEMBER 2015





DDG 1000 SEA TRIALS DECEMBER 2015



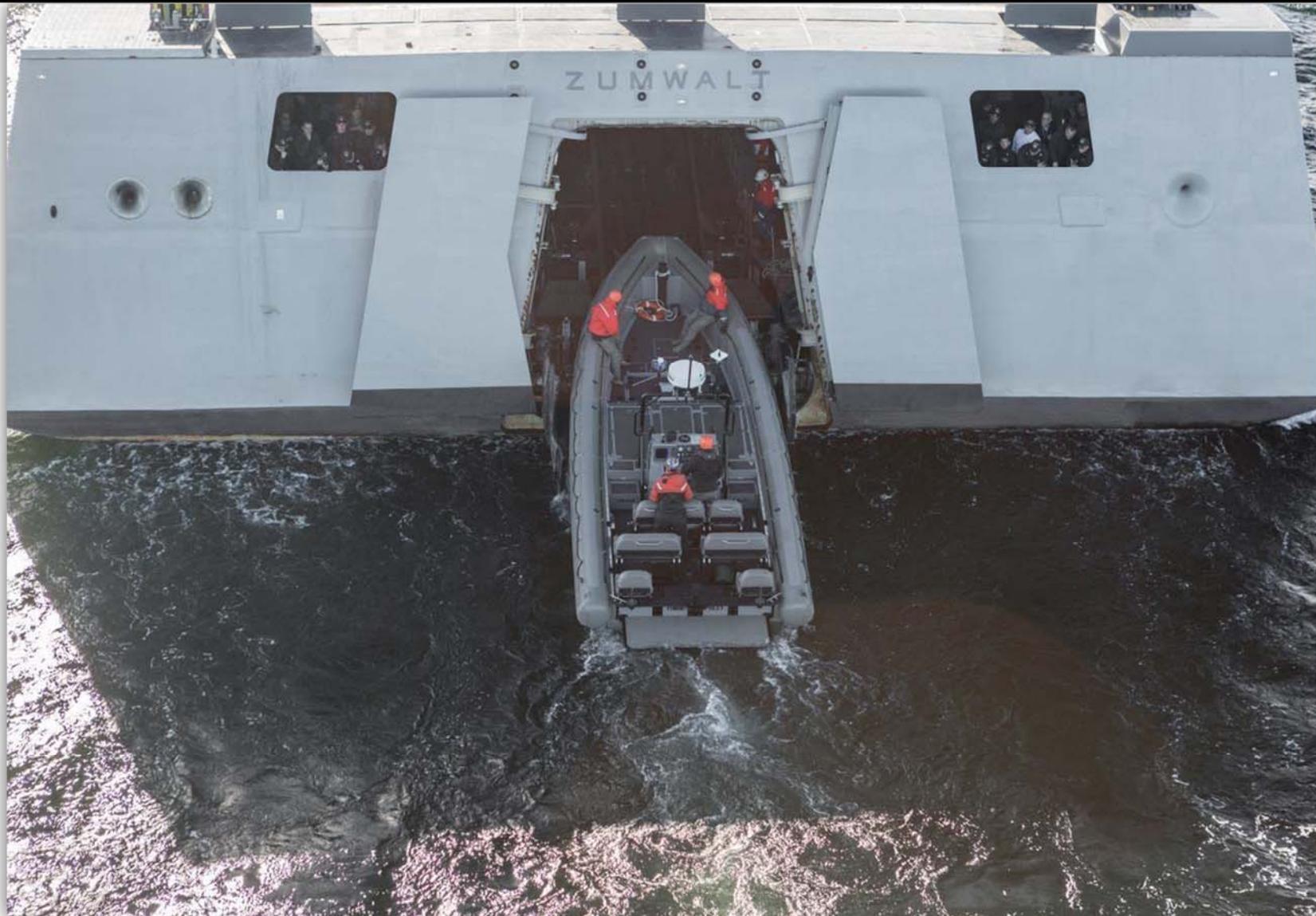


DDG 1000 SEA TRIALS DECEMBER 2015





DDG 1000 SEA TRIALS DECEMBER 2015





DDG 1000 SEA TRIALS

DECEMBER 2015





DDG 1000 SEA TRIALS VIDEO





Alpha Trials Highlights



- **Propulsion events executed**
 - Achieved full power multiple times
 - Executed full ahead, full astern, crashbacks, etc in multiple configurations
- **Anchoring events executed – met performance requirements**
- **Boat launch and recovery executed – met performance requirements**
- **Demonstrated ship handling performance characteristics**
- **Steering events executed– met performance requirements**
 - Full rudder swings ahead, astern during ranging propulsion operations
 - Multiple sea & anchor / restricted maneuvering events executed; performed well
- **Integrated Fight Through Power (IFTP) – met performance requirements**
- **Multiple additional events executed**
- **Logistics well coordinated**
 - Galley and berthing fully exercised
 - Refueling conducted per plan

Successful Alpha Trials conducted 7-13 Dec 2015



Summary



- **DDG 1000 will be a multi-mission surface combatant tailored for the littorals**
 - Signature reduction, active and passive self-defense systems, and enhanced survivability features
 - Designed to fulfill volume firepower and precision strike requirements
 - Provides credible forward naval presence while operating independently or as an integral part of Naval, Joint, or Combined Expeditionary Strike Forces
 - Reduced Life Cycle Cost
- **DDG 1000,1001,1002 under contract and significant production underway**
 - DDG 1000/1001/1002 completion 98% / 84% / 43% as of Jan 2016