DDG 1000 Class Destroyer

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Surface Navy Association (SNA)
29th National Symposium

DDG 1000 Overview

DDG 1000 Program Manager, PMS 500
CAPT Kevin Smith
DDG 1000/1001/1002

DDG 1000

DDG 1001

DDG 1002 Pre-Fabrication Units

94 of 94 Under Construction
DDG 1000 SAIL AWAY
7 SEPTEMBER 2016
DDG 1000 SAN DIEGO, CA
8 December 2016
DDG 1000 Program Highlights

• DDG 1000 arrived San Diego, CA 8 Dec 2016
  – Commissioning in Baltimore, MD 15 Oct 2016 prior to sail around and arrival in her homeport
  – Early combat systems activation and Test & Evaluation activities completed during transit

• DDG 1000 Post Delivery Availability (PDA) and Combat Systems Activation (CSA) activities will commence Jan 2017
  – Industrial work will be completed in San Diego in preparation to activate combat systems (weapons, sensors and communications)
  – Test & Evaluation to commence in FY18 prior to IOC in FY20

• Started DDG 1001 fabrication March 2010 – 91% complete (total ship) (as of 27 Nov 2016)
  – Hangar arrived Oct 2013, deckhouse arrived Sep 2014 at BIW and erected Nov 2014
  – Christening completed 18 Jun, Float Off completed 20 Jun
  – ~ 17,000 of 344,000 work orders remaining; test & activation underway

• Started DDG 1002 fabrication April 2012 – 59% complete (total ship) (as of 27 Nov 2016)
  – Fabrication underway – 55% complete; 94 of 94 units under construction
  – Material at 68% complete
  – Steel deckhouse / hangar design complete, production 46% complete

• Integrated Power System (IPS) provides complete electric plant integration
  – Generates approximately 78 megawatts allowing for integration of future emerging technologies
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

**Key Performance Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Threshold</th>
<th>Objective</th>
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<tbody>
<tr>
<td>Interoperability Top Level IERs</td>
<td></td>
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</tr>
<tr>
<td>Number of Guns</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Gun Magazine Capacity</td>
<td>600</td>
<td>1200</td>
</tr>
<tr>
<td>Vertical Launch Cells</td>
<td>80</td>
<td>128</td>
</tr>
<tr>
<td>Radar Cross Section</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manning</td>
<td>175</td>
<td>125</td>
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<tr>
<td>Survivability (5)</td>
<td></td>
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<tr>
<td>Force Protection (2)</td>
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*Designed to meet all requirements; Evolutionary Acquisition – Spiral Development*
DDG 1000 Characteristics

**Hull**
- Wave-Piercing Tumblehome

**Characteristics**
- Overall Length: 610 ft
- Maximum Beam: 80.7 ft
- Navigational Draft: 27.6 ft
- Speed: 30 kts

**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
- EXCOMM – Alternative Navy C4I POR

**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

**Integrated Power System (IPS)**
- (2) Main Turbine Generators (MTG)
- (2) Auxiliary Turbine Generators (ATG)
- (2) 34.6 MW Advanced Induction Motors

**Superstructure**
- Composite Structure
  - DDG 1000 / 1001
  - Steel
  - DDG 1002

**Aviation**
- (1) MH60R and (3) VTUAVs / 2) MH 60Rs

**Boats**
- (2) RHIBs
  - sized for (2) 7m or (2) 11m RHIBs

**Displacement Full Load**
15,612 LT

**Installed Power**
78 MW

**Crew Size**
147 (plus 28 person aviation detachment)
# DDG 1000 Critical Technologies

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

<table>
<thead>
<tr>
<th>Dual Band Radar (DBR)</th>
<th>Composite Deckhouse &amp; Apertures Test Article</th>
<th>Advanced Gun System (AGS)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SDTS FY06-08</strong></td>
<td>• Composite production ability proven</td>
<td>• Full scale Gun and Magazine produced</td>
</tr>
<tr>
<td></td>
<td>• Tested for RCS and EMI</td>
<td>• Automated Magazine and Gun rate of fire validated</td>
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<tr>
<td></td>
<td>• Validated RCS KPP can be achieved</td>
<td>• Commenced testing onboard DDG 1000</td>
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<tr>
<td></td>
<td>• MFR (X Band) at sea-based testing complete</td>
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<tr>
<td></td>
<td>• VSR (S Band) land based testing complete</td>
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<tr>
<td></td>
<td>• Leap ahead clutter rejection capability in the littorals</td>
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<tr>
<td></td>
<td>• MFR Volume Search modification complete</td>
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<tr>
<td></td>
<td>• MFR Testing underway</td>
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<tr>
<td></td>
<td>• Wallops (2015-2017)</td>
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<tr>
<td></td>
<td>• SDTS (2018)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• DDG 1000 (2016-2018)</td>
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<thead>
<tr>
<th>Integrated Power System (IPS)</th>
<th>Peripheral Vertical Launch System (PVLS) / Advanced VLS</th>
<th>Total Ship Computing Environment (TSCE)</th>
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<tbody>
<tr>
<td>• Full scale testing of components</td>
<td>• Detonation tests and missile restrained firing testing complete</td>
<td>• Software Releases 1-8 complete</td>
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<tr>
<td>• Full rated power and torque validated</td>
<td>• Enhanced survivability design proven and ability to carry all current missiles (SM 2/3/6, ESSM, VLA with CEU mods)</td>
<td>• Open Architecture principles applied</td>
</tr>
<tr>
<td>• Full Power testing completed</td>
<td>• Commenced testing onboard DDG 1000</td>
<td>• Release 7 supported DDG 1000 sail around</td>
</tr>
<tr>
<td>• ECS LBTS testing completed</td>
<td></td>
<td>• Commenced testing onboard DDG 1000</td>
</tr>
<tr>
<td>• HM&amp;E Activation Complete</td>
<td></td>
<td>• Release 8 ready for install onboard DDG 1000 early 2017</td>
</tr>
<tr>
<td>• Alpha Trials Dec 2015</td>
<td></td>
<td></td>
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<tr>
<td>• Builder’s Trials Mar 2016</td>
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<td>• Acceptance Trials Apr 2016</td>
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<th>Integrated Undersea Warfare (IUSW)</th>
<th>Hull Form Scale Models</th>
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<tr>
<td>• At-sea mine avoidance capability proven</td>
<td>• Sea keeping, stability and RCS performance validated by model testing</td>
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<tr>
<td>• Reduced ASW manning validated</td>
<td>• Underwater explosion testing complete – hull whipping requirement validated</td>
</tr>
<tr>
<td>• Commenced testing onboard DDG 1000</td>
<td>• Heavy Weather Guidance received June 2015</td>
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<th>Autonomic Fire Suppression System (AFSS)</th>
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<td>• At-sea weapons effect autonomic fire suppression testing demonstrated</td>
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<td>• Critical technology enables reduced manning</td>
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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

- **HM&E delivery of DDG 1000 completed 20 May 2016**
  - Commissioned 15 Oct 2016 in Baltimore, MD; arrived San Diego, CA 8 Dec 2016
  - Commenced Post Delivery Availability (PDA) / Combat Systems Activation (CSA) in homeport San Diego

- **DDG 1001,1002 under contract and significant production underway**
  - DDG 1001/1002 completion 91% / 59% as of Nov 2016