DDG 1000 Class Destroyer

04 April 2017

Sea Air Space (SAS)

DDG 1000 Overview

DDG 1000 Program Manager, PMS 500
CAPT Kevin Smith
DDG 1000 Program Highlights

• **DDG 1000 arrived San Diego, CA 08 Dec 2016**
  – Commissioning in Baltimore, MD 15 Oct 2016 during sail around and prior to 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 commenced 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 Initial Operating Capability (IOC) in FY20
  – Completed first underway period 27 Feb and second underway period 17 March 2017

• **Integrated Power System (IPS) provides complete electric plant integration**
  – Generates approximately 78 megawatts allowing for integration of future emerging technologies
DDG 1000 Program Highlights

- **Started DDG 1001 fabrication March 2010 – 92% complete (as of 10 Mar 2017)**
  - Hangar arrived Oct 2013, deckhouse arrived Sep 2014 at BIW and erected Nov 2014
  - Christening completed 18 June, Float Off completed 20 June
  - Generator Light Off achieved one month early on 01 March
  - ~ 11,500 of 345,500 work orders remaining; test & activation underway

- **Started DDG 1002 fabrication April 2012 – 59% complete (as of 10 Mar 2017)**
  - Keel lay occurred 30 Jan 2017
  - Fabrication underway; 94 of 94 units under construction
  - Steel deckhouse / hangar design complete, production 63% complete
DDG 1000 SAN DIEGO
DDG 1002 KEEL LAY
30 JANUARY 2017
**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

<table>
<thead>
<tr>
<th>Key Performance Parameters</th>
<th>Threshold</th>
<th>Objective</th>
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<tbody>
<tr>
<td>Interoperability</td>
<td>Top Level IERs</td>
<td>All IERs</td>
</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>
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<tr>
<td>Vertical Launch Cells</td>
<td>80</td>
<td>128</td>
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<tr>
<td>Radar Cross Section</td>
<td>175</td>
<td>125</td>
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<tr>
<td>Manning</td>
<td></td>
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<tr>
<td>Survivability (5)</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
- EXCOMMS – 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
  - DDG 1002
- Steel

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

### Boats
- (2) RHIBs
  - sized for (2) 7m or (2) 11m RHIBs
## 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>MFR (X Band) at sea-based testing complete</strong></td>
<td><strong>Composite production ability proven</strong>&lt;br&gt;<strong>Tested for RCS and EMI</strong>&lt;br&gt;<strong>Validated RCS KPP can be achieved</strong></td>
<td><strong>Full scale Gun and Magazine produced</strong>&lt;br&gt;<strong>Automated Magazine and Gun rate of fire validated</strong>&lt;br&gt;<strong>Commenced testing onboard DDG 1000</strong></td>
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<td><strong>VSR (S Band) land based testing complete</strong></td>
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<td><strong>Leap ahead clutter rejection capability in the littorals</strong></td>
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<td><strong>MFR Volume Search modification complete</strong></td>
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<td><strong>MFR Testing underway</strong></td>
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<td></td>
<td><strong>Detonation tests and missile restrained firing testing complete</strong>&lt;br&gt;<strong>Enhanced survivability design proven and ability to carry all current missiles (SM 2/3/6, ESSM, VLA with CEU mods)</strong>&lt;br&gt;<strong>Commenced testing onboard DDG 1000</strong></td>
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<td><strong>SDTS FY06-08</strong></td>
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<tr>
<th>Integrated Power System (IPS)</th>
<th>Peripheral Vertical Launch System (PVLS) / Advanced VLS</th>
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<tr>
<td><strong>At-sea mine avoidance capability proven</strong></td>
<td><strong>At-sea mine avoidance capability proven</strong>&lt;br&gt;<strong>Reduced ASW Manning validated</strong>&lt;br&gt;<strong>Commenced testing onboard DDG 1000</strong></td>
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<tr>
<td><strong>Full scale testing of components</strong></td>
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<td><strong>Full rated power and torque validated</strong></td>
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<tr>
<td><strong>Full Power testing completed</strong></td>
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<td><strong>ECS LBTS testing completed</strong></td>
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<td><strong>HM&amp;E Activation Complete</strong></td>
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<td><strong>Alpha Trials Dec 2015</strong>&lt;br&gt;<strong>Builder’s Trials Mar 2016</strong>&lt;br&gt;<strong>Acceptance Trials Apr 2016</strong></td>
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<td><strong>SDTS (2018)</strong></td>
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<td><strong>DDG 1000 (2016-2018)</strong></td>
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<tr>
<th>Integrated Undersea Warfare (IUSW)</th>
<th>Total Ship Computing Environment (TSCE)</th>
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<tr>
<td><strong>Autonomic Fire Suppression System (AFSS)</strong></td>
<td><strong>Software Releases 1-8 complete</strong>&lt;br&gt;<strong>Open Architecture principles applied</strong>&lt;br&gt;<strong>Release 7 supported DDG 1000 sail around</strong>&lt;br&gt;<strong>Commenced testing onboard DDG 1000</strong>&lt;br&gt;<strong>Release 8 ready for install onboard DDG 1000 early 2017</strong></td>
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<td><strong>At-sea weapons effect autonomic fire suppression testing demonstrated</strong>&lt;br&gt;<strong>Critical technology enables reduced manning</strong></td>
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**Distribution Statement A: Approved for Public Release. Distribution is unlimited.**
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 92% / 60% as of March 2017
  – DDG 1001 GLO 01 March 2017
  – DDG 1002 Keel Lay 30 January 2017