DDG(X) Program

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• The DDG 51 class is an outstanding success for the Navy and holds the record for the longest production run of any surface combatant in Navy history
  – Production started in 1985 and continuing beyond 2027
  – DDG 51 FLT III will provide the world’s best Integrated Air and Missile Defense (IAMD) combat system elements for the near term fight
    - Likely to remain in the Fleet through the 2060s
    - Limited in the ability to incorporate future upgrades that consume additional space, weight or power requirements

• Naval planning for the 21st century requires upgrades for the future fight. DDG(X) will provide flexibility for:
  – Increased missile capacity
  – Sensor growth
  – Longer range offensive anti-surface and strike capabilities
  – High power Directed Energy weapons (e.g. lasers)
  – Increased survivability
  – Increased efficiency to reduce operational costs & demands
    - Supported by an efficient Integrated Power System (IPS) that provides operational flexibility as well as power efficiency
  – Reduced impact on Command Logistics Fleet and improved Distributed Maritime Operations

New Hull Form Required to Introduce Enhanced Capability to Fleet and Pace Threat
• DDG(X) will utilize successful evolutionary development approaches from Destroyers, Cruisers, Frigates, CG 47 to DDG 51 upgrades vice revolutionary approach
  – Lessons learned from previous shipbuilding programs used to inform requirements development, design strategy and execution plans

• DDG(X) will provide the flexibility and margins necessary to become the Navy’s next enduring large surface combatant
  – Combine DDG 51 FLT III combat system elements with a new hull form
  – Resets SWAP-C margins
  – Minimize incorporation of new technologies
  – Include an efficient IPS
  – Provide greater endurance, reducing the Fleet logistics burden

• CNO approved Top Level Requirements (TLR) in December 2020 set clear path for DDG(X) execution
  – Draft Capability Development Document developed in Oct 2021

• DDG 51, Virginia, and Columbia program lessons learned demonstrated up front industry involvement is key enabler to program success
  – Columbia program Integrated Product and Process Development (IPPD) process used to help inform early relationship and industry involvement on DDG(X)
# Top Level Requirements Overview

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| **Flexibility**        | • *Reestablish new construction SWAP-C margins* - Arrangeable area margin of 5% beyond reservations; Weight margin of 10%; modern naval architecture requirement for KG of .4m; Power margin of 20% + debitable power from propulsion via IPS; Cooling at 20% upgradeable to 40%;  
* • *Space reservations for future upgrades* - AMDR and C4I growth, high power directed energy, Large Missile cells in place of 32 VLS cells; IPS for power flexibility; pre-planned growth for additional VLS, Large Missile cells, or future capabilities |
| **Vulnerability**       | • Improved over FLT III in maintaining mobility & IAMD after damage;  
* • Acoustic, IR and UEM signatures all improved by >50% |
| **Mobility**            | • Current design objectives: Range >50% increase; Time on station >120% increase; Efficiency >25% increase |
| **Capability**          | • Utilize FLT III Combat System elements + two 21-cell RAM launchers. Supports increase in VLS cells, Large Missile Launcher cells, sensor growth, Directed Energy weapons, C4I |
DDG(X) Design-Enabled Warfighting Improvements

- **Self Defense**
  - Improved self-defense with (2) 21-cell RAM launchers

- **Aviation**
  - Increased hangar size

- **Destroyer Payload Module Option**
  - 2 x SVTT for ATT (P/S)

- **Environmental Performance**
  - Expanded Arctic Operations & Improved Seakeeping

- **Survivability**
  - Improved survivability and enhanced mobility

- **Command & Control**
  - Air Defense & UxV control

- **Integrated Power System (IPS)**
  - IPES

- **Design-enabled Improvements**
  - Baseline Capabilities
  - Future Capabilities

**DDG(X) – Designed Lethal, Affordable, Upgradable & Sustainable**
• Deliberate Technology Maturation and Risk Reduction
  – Non developmental ship systems - land based testing to reduce critical risks prior to Detail Design and minimize risks prior to ship activation
  – Developing early and robust Model Based Systems Engineering (MBSE), Modeling and Simulation (M&S), Controller Hardware in the Loop (CHIL), and Power Hardware in the Loop (PHIL) plans to help inform early design decisions

• Critical Risks Identified
  – DDG(X) Land Based Testing for hull form and IPS will be executed at NSWC Carderock and NSWC Philadelphia planned
  – IPS testing supports component level-prototyping, system integration testing, and full-scale demonstration
  – Retires risk early by completing critical systems testing prior to Milestone B approval
DDG(X) Program Status

- Preliminary through Detail Design for DDG(X) will be accomplished through a collaborative, multi-disciplinary Navy-industry effort composed of the surface combatant shipbuilders, suppliers, ship design agents and other subject matter experts
  - Collaborative design team promotes preservation of skilled / experienced Large Surface Combatant design workforce
  - Shipbuilders integrated into the team in March 2021 to help inform early decision process
    - Design decisions informed by producibility and program affordability
- Program currently in Concept Formulation with plans to enter Preliminary Design in FY22
- CNO approved Top Level Requirements (TLR) in Dec 2020 informed draft CDD development
- Acquisition Strategy in development, informed by:
  - Columbia IPPD process
  - DDG 51 Flt III to DDG(X) production transition
    - Developing thoughtful transition plan to help manage Large Surface Combatant skilled workforce and workload