Shipbuilding and Acquisition

Columbia Program Case Study

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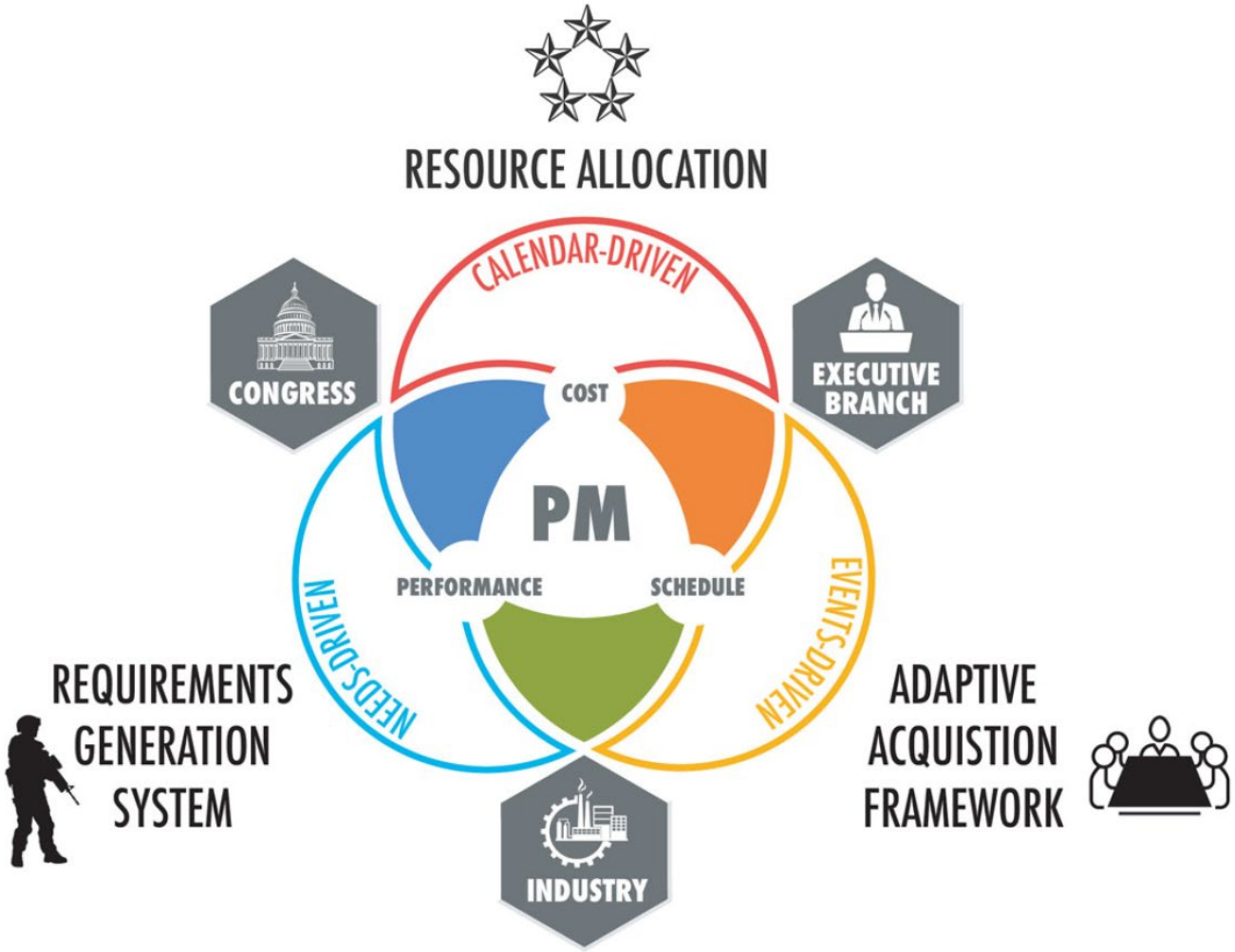
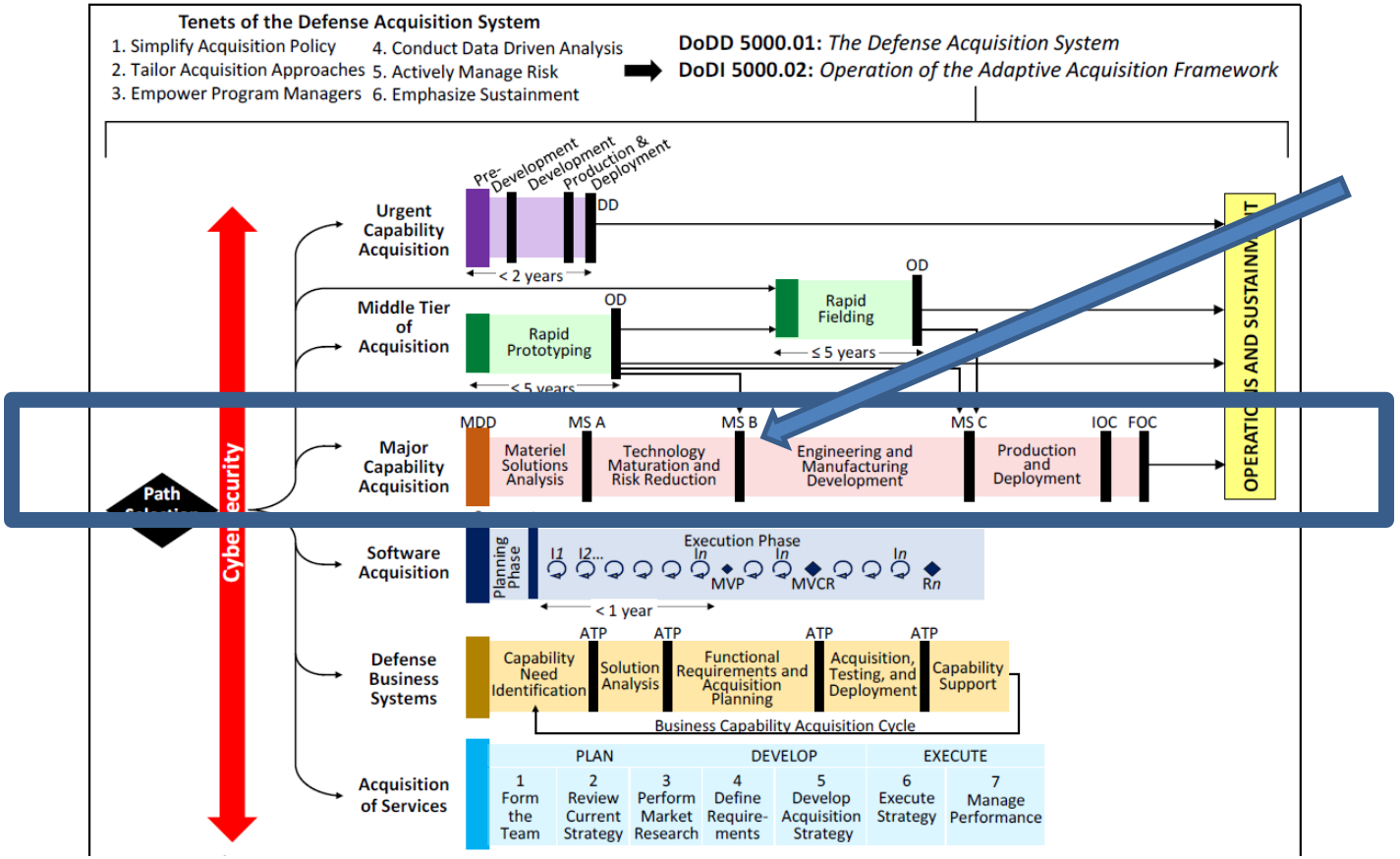
Shipbuilding and Acquisition

- **General Approach:** Use the Columbia program to enhance critical thinking and decision-making skills with respect to program's acquisition program baseline, and affordability considerations.
- **Applicability:** Defense Acquisition professionals
- **Overall Learning Objectives:**
  - Analyze a program at a key decision point—***critical thinking***.
  - Identify and engage key stakeholders—***stakeholder engagement***.
  - Develop and compare alternative recommended strategies—***decision making***.
  - Identify second-order considerations of the recommended strategies—***strategic leadership***.

DoD Acquisition Framework



Adaptive Acquisition Framework



Defense Acquisition - *Navy Specific*

DEPARTMENT OF THE NAVY
OFFICE OF THE SECRETARY
1000 NAVY PENTAGON
WASHINGTON DC 20350-1000

SECNAVINST 5000.2G
ASN (RD&A)
08 Apr 2022

SECNAV INSTRUCTION 5000.2G

From: Secretary of the Navy

Subj: DEPARTMENT OF THE NAVY IMPLEMENTATION OF THE DEFENSE ACQUISITION SYSTEM AND THE ADAPTIVE ACQUISITION FRAMEWORK

Encl: (1) References
(2) Responsibilities
(3) Department of the Navy Urgent Needs Process and Urgent Capability Acquisition
(4) Middle Tier of Acquisition
(5) Major Capability Acquisition
(6) Software Acquisition
(7) Defense Business Systems
(8) Defense Acquisition of Services
(9) Systems Engineering
(10) Test and Evaluation
(11) Life-Cycle Sustainment
(12) Property Management During Acquisition and Sustainment
(13) Information Technology Requirements
(14) Cybersecurity Requirements
(15) Joint Requirements and Capabilities Development
(16) Two-Pass, Seven-Gate Governance
(17) Data Across the Acquisition Pathways
(18) Mandatory Legal Reviews and Arms Control Compliance Reviews of Weapon Systems

SECNAVINST 5000.2G

Key Highlights

- Implements Adaptive Acquisition Framework (AAF) within DoN
- MDAs are authorized to ***tailor*** acquisition strategies appropriately
- For MDAPs, the MDA must ensure that the Service Chief concurs with the cost, schedule, technical feasibility, and performance trade-offs.

SECNAVINST 5000.2G

Key Highlights

- ACAT level definitions same as DoDI
- ***First Ship in Shipbuilding Program Report***: required to be submitted by SECNAV to the congressional defense committees prior to the approval of the start of construction of the first ship for any major shipbuilding program.

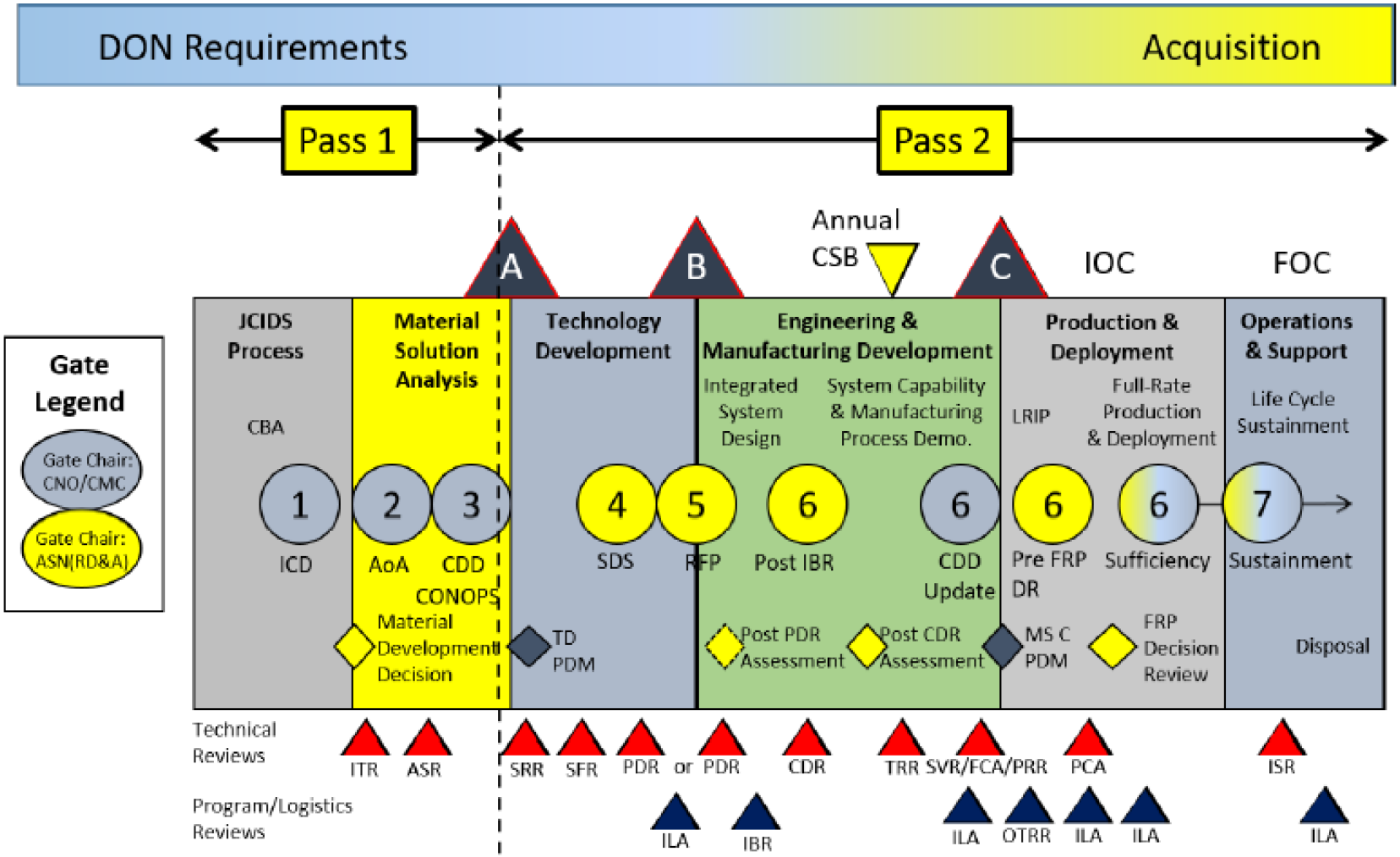
SECNAVINST 5000.2G

DON's Two Pass Seven Gate Governance:

- Applies to all acquisition programs
- ***integrated, collaborative, and disciplined*** framework for requirements, resources, acquisition, and warfighting communities to make sound ***investment decisions*** at key points within the ***JCIDS and the DAS***
- ***CNO/CMC and ASN (RD&A) shall*** implement these procedures in a collaborative manner to arrive at informed decisions.

Two Pass Seven Gate

DON Requirements/Acquisition Two-Pass Seven-Gate Proccess with Development of a System Design Specification



Acquisition – *Ship Building*

Are Ships Different?

Policies and Procedures for the Acquisition of Ship Programs

RAND NATIONAL DEFENSE RESEARCH INSTITUTE

Acquisition – *Ship Building*

Why ship programs are different? ***No dedicated test assets – every asset enters Service and….***

- length of time to design and build
- importance of industrial/political factors
- concurrency of design and build
- complexity
- low quantity/production rate
- high unit cost
- type of funding
- test and evaluation procedures.

Acquisition – *Ship Building*

DoD 5000 regulation's emphasize program tailoring, but….

- ***Ship programs normally formally initiated at MS A as PoR*** (normally at MS B)
  - ➢ Concurrency of technology development and system design activities
- ***MS B is initial production authorizing construction of lead ship*** (normally at MS C)
  - ➢ Begin manufacture during EMD phase
- ***Leads to ambiguous definitions for MS C (LRIP and FRP decision points for ships***

Acquisition – *Ship Building*

DoD 5000 regulations are ambiguous about the MS B definition of ship programs.

- ***DoD instruction states MS B authorizes lead ship and long leads for follow-on ships.***
- ***Navy instruction states MS B authorizes lead ship and initial follow-on ships.***

No specific language on the definition of MS C (LRIP) or FRP decisions.

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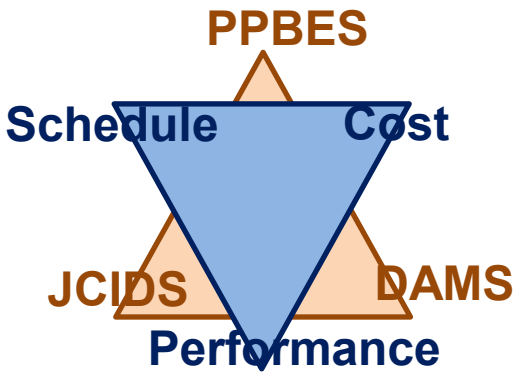

- U.S. Navy nuclear ballistic missile submarines (SSBN) for strategic deterrence mission
- The nuclear triad is composed of three components: air, land, and sea-based deterrence.
- 14 SSBNs that roam the world's oceans
- Ohio-class SSBNs are beginning to reach the end of their already extended 42-year service life
- Ohio-class SSBNs: 24 Trident II submarine-launched ballistic missiles (SLBMs)

Acquisition – Submarines (SSBN)

Ballistic Missile

Ohio Class SSBN 730-743

FLEET BALLISTIC MISSILE SUBMARINES - SSBN

Description
Since the 1960s, strategic deterrence has been the SSBN's sole mission, providing the United States with its most survivable and enduring nuclear strike capability.

Features
The Navy's ballistic missile submarines, often referred to as "boomers," serve as an undetectable launch platform for submarine-launched ballistic missiles (SLBMs). They are designed specifically for stealth and the precise delivery of nuclear warheads.

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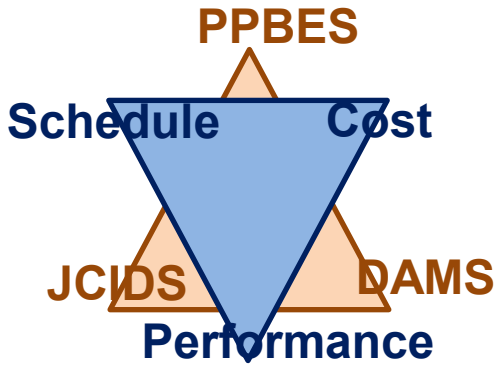
Columbia-class SSBN Description

- USS *Columbia*, is set to be completed and turned over to the Navy by 2030 and ready to execute its first strategic deterrence patrol in 2031
- ***According to ADM Gilday, "[the] Columbia-class is our number one acquisition priority" and "these submarines need to be delivered on time, on budget, and ready for the fight – we have no margin to fall behind"***



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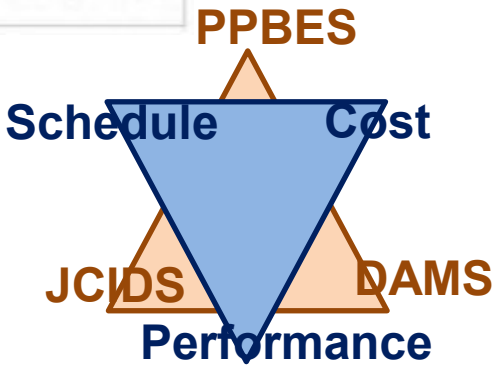
History of Significant Developments Since Program Initiation

History of Significant Developments Since Program Initiation	
Date	**Significant Development Description**
July 2008	USD AT&L issues ADM directing entry into the Concept Refinement Phase and conduct of an Analysis of Alternatives.
October 2008	Secretary of Defense sends letter to United Kingdom (UK) Secretary of State for Defense to affirm the U.S.-UK Mutual Defense Agreement and cost sharing for the Common Missile Compartment.
September 2010	SCP approved with new design SSBN based on 12 ships with 16 - 87" missile tubes.
January 2011	Milestone A ADM issued which authorized entry into Technology Maturation and Risk Reduction (TMRR) phase to complete a new design SSBN based on 12 ships with 16 - 87" missile tubes.
February 2012	PB 2013 shifts lead ship construction from FY 2019 to FY 2021; the two year recapitalization delay removed all margin during the OHIO-OHIO Replacement (OR) transition period (FY 2027- FY2042), any delay in OR delivery or unexpected aging impact to OHIO will have significant impacts on SSBN Ao.
December 2012	RDT&E Design Contract issued to General Dynamics – Electric Boat.
December 2014	National Sea-Based Deterrence Fund established by Public Law 113-291.
November 2015	Incremental funding authority and authority to enter in contracts for Advance Construction and economic order quantity provided by Public Law 114-92.
January 2017	Milestone B APB approved (Program Initiation).
September 2017	Award of the Integrated Product and Process Development (IPPD) contract. The Navy has transitioned all design efforts from the OHIO Replacement Research & Development (R&D) Design contract to the IPPD contract.
September 2018	Award of the Two Year Advance Procurement Funding modification to the IPPD contract.
February 2019	APB updated to reflect actual award of IPPD contract (September 2017) and align affordability targets with approved CDD.

Bottom Line: Key Acquisition Data

- MS A in Jan 2011
- MS B in Jan 2017
- IOC: 2031
- AO: 12 Columbia-class SSBNs for $128B Program



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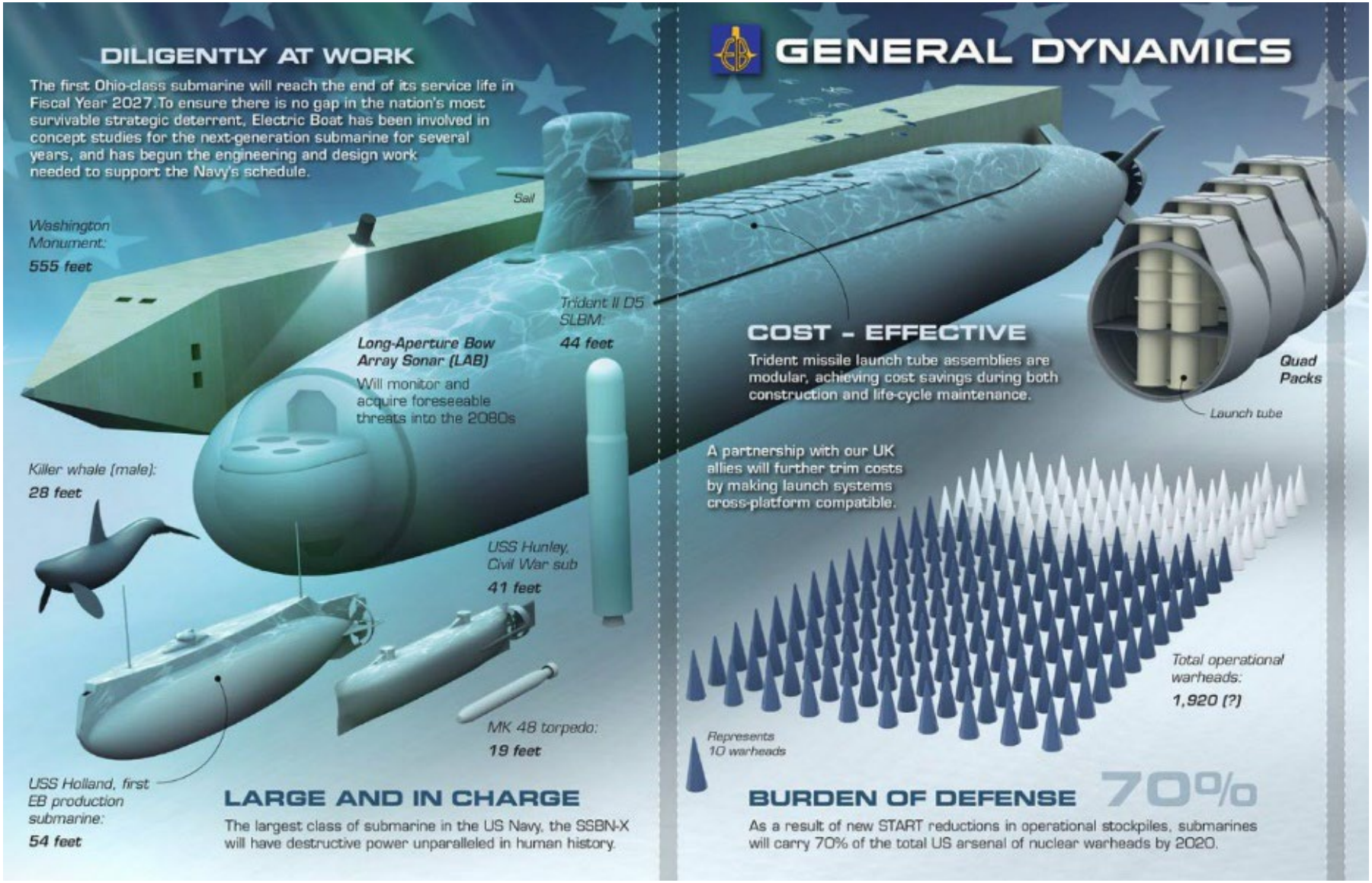

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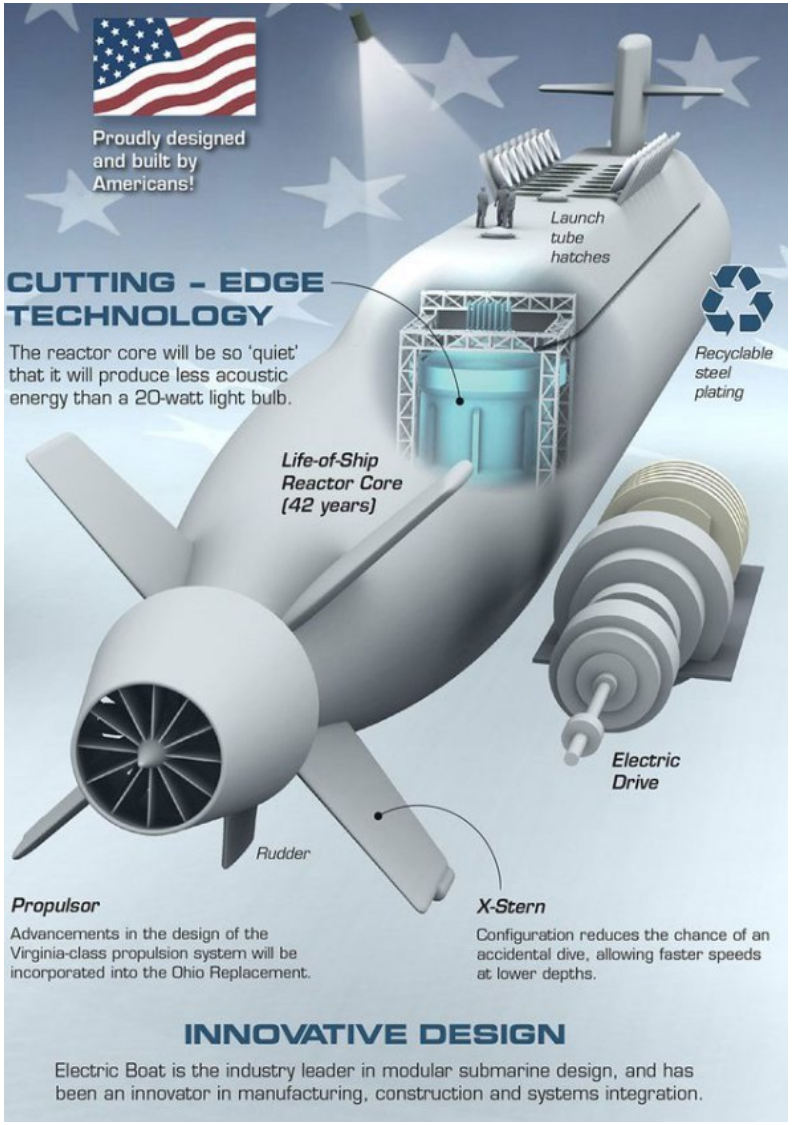


Cutting Edge Technology

- Nuclear reactor that will not require refueling for the lifetime of the submarine - ***no mid-life refueling***
- First electric-drive propulsion system
- X-shaped stern configuration
- Most modern sonar suite
- Most advanced sound silencing capabilities.
- Carry up to 16 Trident D-5 missiles

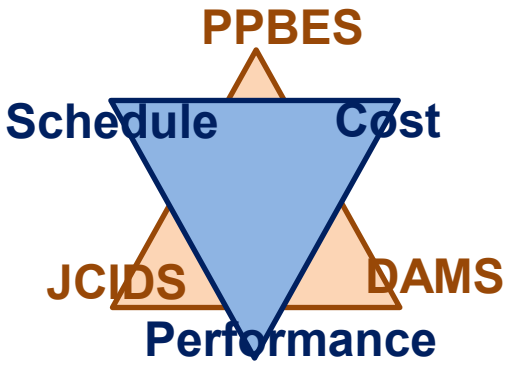
Columbia Program Case Study

What's the issue?

Issue: IOC for USS *Columbia* at risk
Root Cause: cost, schedule and performance constraints, technical maturity and manufacturing capability/capacity

Stakeholders

- CNO
- PEO Strategic Submarines
- DASM Ships
- SECNAV
- Navy
- Shipbuilders and shipyards
- Congress
- Sailors



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Issue: IOC for USS *Columbia* at risk

Root Cause: cost, schedule and performance constraints, technical maturity and manufacturing capability/capacity

Constraints/Considerations:

→ APB

Total Acquisition Cost						
Appropriation	BY 2017 $M		BY 2017 $M	TY $M		
	SAR Baseline Development Estimate	Current APB Development Objective/Threshold	Current Estimate	SAR Baseline Development Estimate	Current APB Development Objective	Current Estimate
						13039.4
						113563.8
						111110.9
						105415.6
						5695.3
						2452.9
						2452.9
						0.0
						186.2
						0.0
						126789.4

SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Demonstrated Performance	Current Estimate
Operations and Support (O&S) Cost KSA				
Average annual O&S cost per unit of $96M (CY 2010$)	Average annual O&S cost per unit of $119M (CY 2017$)	Average annual O&S cost per unit of $131M (CY 2017$)	TBD	$120.2M (CY2017$)
Net-Ready KPP				
Meet the requirements defined within the OR SSBN PIIT of the Common Submarine Information Support Plan	Meet the requirements defined within the OR SSBN PIIT of the Common Submarine Information Support Plan	(T=O) Meet the requirements defined within the OR SSBN PIIT of the Common Submarine Information Support Plan	TBD	Meet the requirements defined within the OR SSBN PIIT of the Common Submarine Information Support Plan
Lead Ship First Deployment Key Schedule Parameter				
Third quarter of FY2030	Third quarter of FY 2030	First quarter of FY 2031	TBD	First quarter of FY 2031

Columbia Program Case Study

Challenges Facing the Program:

- Supplier base that is roughly 70% smaller – to produce 1 Columbia and 2 Virginia class subs per year
- Inexperienced shipyard workforce
- Immature computer-aided software to design
- Quality problems with supplier materials
- Technical risk for electric drive system
- Aggressive Production Schedule – lead ship built in 84 months – faster than any other lead sub class
- Cost Growth Risk: Lead ship estimate at $14B ($700M over baseline estimate)
- CPIF contract type for all 12 subs
- Risk to other Shipbuilding Programs at $8B each

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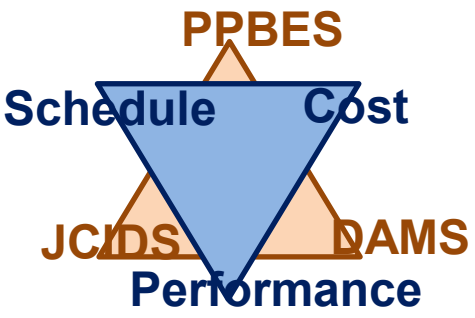

Pressures:

- Schedule
- Cost
- Performance
- Congress
- Industry

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Issue: IOC for USS *Columbia* at risk

Root Cause: cost, schedule and performance constraints, technical maturity and manufacturing capability/capacity

- ***How important is the strategic deterrence gap?***
- ***How important is the Shipbuilding DIB?***
- ***Cost and Affordability?***
- ***How is important is "state of art" versus "state of practice"***
- ***Performance linked to technical risk***

Shipbuilding Lessons Learned

Inh
Fai
Nav

By: Me
July 31,

am
s

US Navy

INSIDER

"We really shouldn't introduce more than maybe one or two new technologies on any complex platform like that ..."