Changing Course to a 21st Century Acquisition Strategy: Navy-Industry Collaborative Design

Tim Nichols:

Phone: 15132890121; tim.nichols@ubiquitechllc.com

CAPT Barry Tibbitts, USN(ret.):

Phone: 17036423994; bftibbitts@yahoo.com

Peter Jaquith:

Phone: 18582548057; petejaquith@earthlink.net

Robert Keane:

Phone: 12408182666; keanerg@comcast.net

SITREP

- Post-Cold War era is over.
- Peer navies growing in size and strength.
- COCOMs' requirements overstress ships and personnel
  - Number of battle force ships stuck at 300 for over a decade
  - Many ships offline for maintenance/modernization for long periods
  - New ships "deliver" years before deployable and over budget
- Future force **level** uncertain: 350 or 400 or 500
- Future force **mix** also uncertain: DDG(X), CVLs, Light Amphibious Warship, and broad array of Unmanned Systems

USN at Historic Inflection Point

Figure: (1)

BUILD ON SUCCESS

- US submarine community
  - Design-build strategy
  - Shipbuilders' collaboration early in Navy - led design
- Asian Aegis Shipbuilders
  - Proven design-build strategies
  - No arbitrary displacement/size constraints thus less dense ships
- NATO Shipbuilders
  - Long-term commitment (>30 years) to more adaptable surface combatants
  - Shipbuilders' early collaboration (including other nations)
  - Modular combat systems
- 1980s build up to 600-ship Navy
  - Tailored approaches with Navy-led designs: FFG 7, CG 47/52, DDG 51 FLTs I/II/IIA, CVN 76, LPD17
  - SEA 05 controlled ship design resources/capabilities

Figure: (2)

Leverage Best Practices and Proven Principles of Good Design

AVOID PAST MISTAKES

- Acquisition Reform
  - Gutted NAVSEA 05 - Shifted early design responsibly to industry
  - Reassigned ship design funds from SEA 05 to PMs
  - Wasted scarce resources on designs never built
- DDG 1000
  - Many high-risk developmental systems
  - Took too long - basic mission became OBE
- LCS
  - Bypassed checks and balances determining requirements & costs
  - Rushed ships into production a decade before mission systems ready

Focus on Building a World Class Team and Reducing Risks

Figure: (3)

NEED BOLD NEW ACQUISITION STRATEGY

- Involve industry early
  - AOA cost/capability/risk studies which establish requirements
  - Incorporate production planning into Navy - led ship design teams
  - Ensure design decisions facilitate manufacturing and construction
    - In both shipyards when construction will be split
  - Review/comment on shipbuilding specifications/contract drawings
  - Expand contract design to include aspects of functional design
  - Assist in developing 3D product model
- Leverage digital twin/digital thread to minimize Total Ownership Costs

Navy-Industry Collaborate for Innovation Good for the Nation

Figure: (4)

MORE AFFORDABLE, ADAPTABLE AND SUSTAINABLE NAVAL SHIPS

- 21st Century Acquisition Strategy
  - Industry collaboration starting in early-stage design
  - Increased design quality & reduced cost/work content
- Design for Performance & Reduced Cycle Time
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  - Robust contract design definition strategy
  - Increased service life allowances
  - Early consideration of maintenance & upgrade
- Early 3D Product Model Development
  - 3D Product Model initiated in early-stage design
  - M&S of maintenance & CS equipment loadout
  - Build Strategy included in 3D product model

Figure: (5)

Design for: Performance, Construction, Sustainment and Upgrade

OPTIMIZE DESIGN-BUILD PROCESS

- 21st Century Acquisition Strategy
  - Navy/shipbuilder collaboration starting in early-stage design
  - Two shipyard DD&C – reduced schedule & increased learning
- Design-Build Strategy
  - Design for performance, construction, sustainment, upgrade & reduced cost
  - Early-stage production engineering & lean optimization
  - Work content identified in 3D product model
- Warship Manufacturing Strategy
  - Focus on planned & controlled production
  - Navy, shipbuilder & supply chain integration
  - Design, material and tooling support of production
  - Focus on continuous improvement & schedule reduction

Figure: (6)

Design-Build to Enable Durability and Longevity > 40 years

NATO NAVY ACQUISTION INNOVATIONS

- **Acquisition Initiatives:**
  - Public-Private Focus on Surface Combatant Development: >30 years
  - Joint Shipbuilding Coalitions: in Germany, UK, Denmark, France, Italy, etc.
  - Versatile Designs: 1,500 payload modules for a family of warships designs
  - Durable Designs: 40+ years of operational relevance/superiority with multiple upgrades
  - Pursuit of both domestic and international naval programs with collaborative design/platform/specs.
- **Key Drivers/Motives for Initiatives:**
  - Meeting concurrently naval operational obligations and defense budgetary constraints
- **Results:**
  - Average price of first 10 FFG62 frigates = $135,000 USD/long ton(FL)
  - Average price of first 5 RN F31 frigates = $100,000 USD/long ton(FL)
  - Successful collaborative programs:
    - German Navy: F125 Frigate: tkMS and Luerssen;
    - German Navy: F126 Frigate: Luerssen and Damen
    - UK RN: F31 Frigate: BMI and OMT
    - Danish Navy: Frigate and Supply Ship common hull

Figure: (7)

Double-Digit Improvements in:
Productivity, Cycle Reduction and Production Through-Put

ACQUISITION RELATED RECOMMENDATIONS

- Foster Substantive Collaboration Between USN & US Shipbuilding Industry Officials Including WSI & key Naval Suppliers
- Form Group of Industry Experts to Accelerate Digital Transformation Across the USN enterprise based on best practices from related industries, e.g., aerospace, defense, utility
- Form Flag-Level Committee to Develop a Long-Term 50-year Naval Warship Design, Construction and Sustainment Strategy
- Form Indo-Pacific Naval Special Interest Group to Maximize Return on Total Investment and Synergy Among New Naval Shipbuilding Programs in the USA, Canada, Australia, Japan, South Korea, India, etc.
- Build career development program to develop future naval Ship Design and Program Managers focused on naval shipbuilding best practices, innovations and lessons learned

Figure: (8)

Long-Term Commitment to the Next Generation of Naval Warships