2013 Global Shipbuilding Executive Summit Report

Introduction

The Global Shipbuilding Executive Summit (GSES) IV, sponsored by the American Society of Naval Engineers (ASNE) in affiliation with Siemens PLM Software, was held on February 21, 2013. Previous GSES summits concentrated on improving ship affordability and reducing total ownership cost (TOC), a focus that was sharpened in 2012. Summit IV built upon this foundation, but it also featured a revised format designed to foster even more action-oriented dialogue between the Navy and industry. Issue-wise, GSES IV concentrated on the following key areas:

1. using more commercial practices, procedures and products in naval shipbuilding
2. improving integration between the core hull systems and payloads
3. modularizing ships to facilitate upgrades throughout the life cycle
4. determining which current ship design practices are limiting future operational flexibility.

Attendance at GSES IV included a broad range of shipbuilding leaders from government and industry, including 65 government and industry VIPs, 12 flag officers, and representatives from the Royal Danish Navy. Ronald Kiss, president of ASNE, was the host of Summit IV. Tim Nichols, Managing Director of Aerospace and Marine at Siemens PLM Software, represented the sponsor. RDML(Ret.) Joe Carnevale of Shipbuilders Council of America moderated the event.

The magnitude of the issues with which Summit IV participants are dealing was emphasized by this year’s keynote speakers, RDML David H. Lewis, Program Executive Officer (PEO) for Ships, and RADM Thomas S. Rowden, Director of Surface Warfare (N96) in the Office of the Chief of Naval Operations (OPNAV). For his part, RDML Lewis looked back to the interwar period, when the Imperial Japanese Navy closely studied then-prevailing technology, doctrine, and tactics to develop the Yamato-class battleships. These ships were built on-time and on-budget, were of high-quality construction, and promised to be world-class warships for what they were designed to do — engaging U.S. battleships and other combatants in decisive surface engagements.

As RDML Lewis noted, however, the Yamato-class ships were almost completely useless during World War II. These ships represented a “point design”, optimized for a specific mission and operational circumstance that did not occur in the aircraft carrier-dominated war in the Pacific. The decade of the 1930s, when the Yamato design was developed, was a time of significant uncertainty, yet Japanese designers did not incorporate the flexibility that these ships would need as technology and operational circumstances changed.

RDML Lewis stated that the Yamato represents a cautionary tale for the U.S. Navy and those who design and build its warships. We are again in a period of great uncertainty, he said, and this must be reflected in the Service’s ship designs. With no clear view as to which missions ships with potential 50-year expected service lives will be called on to perform during their lifetimes, having broad operational
adaptability will be critical. Moreover, obtaining that adaptability may require the Navy and industry to do things very differently than they have during the past half century. RDML Lewis concluded with the admonition that “we have to get it right” for the sake of the Nation and the Navy.

RADM Rowden continued to build upon this theme, emphasizing that Navy warships constructed in 2022 will still be in service in 2062, and that these ships must maintain their operational relevance throughout their entire service lives. To accomplish this, ships must be “flexible, adaptable, and modular,” he said. Addressing the key attributes of the ships the Navy needs to build, RADM Rowden said that requirements for these warships must be laid down in “bins” that include both requirements for the ship itself and for the ship’s combat system. For the former, the Navy needs to pursue commonalities wherever possible, possibly to a point where all ships would be nearly “the same below the second deck”. Such an approach would pay significant dividends in training, integrated logistics support, and other areas, which in turn would have a significant downward effect on TOC. Navy warships’ combat systems, on the other hand, must evolve on a different, more rapid cycle than the other ship systems, RADM Rowden said. The ability to insert the capabilities needed to meet changing operational needs will be a critical element to maintaining ship relevance over time.

A key question then, RADM Rowden concluded, is the boundary between the combat system and the ship itself. How, he asked, does the Navy develop the common interfaces and interface control — the area “where the up-front brain work needs to be” — to develop the ships it needs, and what can N96 do to foster this effort?

Task Statements and Recommendations

With those insights, summit participants were then asked to consider four, multi-part task statements (listed below), which in turn were driven by the aforementioned key focus areas — commercial practices, products, and procedures; improving core hull and payload integration; modularization; and the link between design practices and operational flexibility. Participants were assigned to one of nine tables; each table considered one of these four task statements. After briefing their conclusions and recommendations, the participants were asked to cast their vote for the two recommendations presented during the Summit that they believed were most important for Navy/industry teams to pursue. After a tally of votes, the top two recommendations were as follows:

1. Identify desirable commercial practices and procedures that have military applications.
2. Compile list of best practices from navy/industry teams — for example, those in the Netherlands, South Korea, Germany, Denmark, and elsewhere — who have dealt with the same flexibility, adaptability, integration, and modularization challenges that the U.S. Navy now faces.

Runners-up to these top recommendations included:

- Reestablish joint government/industry contract design teams.
- Act to define standard interfaces.
- De-couple platform and capabilities to improve life cycle operational flexibility.
- Design mission systems for periodic refreshing.

The following is a list of all the focus-area task statements, as well as the observations made and recommendations reached by the various participant table-teams that considered them.

1. Using more commercial practices, procedures, and products can reduce the cost of shipbuilding. How can military shipbuilders and their Navy customers work together to implement the right balance of commercial with military? How would we know if we had the right balance?

**Recommendations:**

- Identify desirable commercial practices and procedures that have military applications; do so before requirements are set.
- Determine balance and trade-offs between commercial and mil-spec, and initial costs versus life cycle costs.
- Reestablish joint government/industry contract teams prior to financing the design.
- Institute cost-estimation teams as part of the on site contract design team.
- Use value engineering contractual clauses to offer additional opportunities for innovation and cost savings.
Offer industry the opportunity to propose alternative solutions without being contractually penalized.

2. Integration, especially in complex combatants, can be one of the most significant expenses in ship construction. Can shipyards build the basic ship and let others integrate the complex systems, even if it is at another facility? What are the “pros and cons?” Where are the efficiencies and pitfalls? What is needed to enable this concept to work?

Observations:
- This kind of integration is already being accomplished to a certain extent (e.g., DDG 1000, Virginia-class submarines, Littoral Combat Ships, Aegis upgrades, combat system upgrades in repair yards and public yards).
- Some “pros”: Repetition leads to lower costs, SUPSHIP redundancies can be reduced, modularity allows platform reuse, less cost equals more ship. Some “cons”: Possible chokepoints, more complexity in up-front design, the need for firm specifications and interface control documents.

Recommendations:
- Make the government the combat system integration manager (although this might generate significant political friction).
- Generate specifications and standards, especially for the combat system.
- Develop one source for different modules on each coast to eliminate chokepoint problems.
- Develop predictable production schedules to facilitate a stable labor force and enhance learning.
- Use all available resources (e.g., SD-8, ASNE, NSRP, Aegis Test Team, LCS Council).
- Compile a list of best practices from navy/industry teams — for example, those in the Netherlands, South Korea, Germany, Denmark, and elsewhere — who have dealt with the same flexibility, adaptability, integration, and modularization challenges that the U.S. Navy now faces.
- Develop an activity-based costing model (government/industry).

3. Modularity can make upgrading a ship over its life cycle substantially less expensive. How do you best take advantage of the interfaces and control drawings to rapidly adapt to changing technical, tactical, and fleet architecture needs?

Observations:
- Modularity has a different character in the combat system and HM&E areas. For combat systems it means “scalability,” reuse/recapture, common-source libraries, streamlined training, etc. Modularity for HM&E focuses on pumps, control systems, machinery plants, etc.
- To effectively implement modularization requires, at the top level, an analysis of operational expectations (i.e., developing notional scenarios that define technological and capability boundaries), an analysis of technology trends to determine required refresh rates and limiting factors (e.g., power), and the consolidation of those analyses into “envelopes” that drive modules, interfaces, and ship sizing.
- Control of specifications is possible with a managed IDS (for the ship and the combat system); this can get complicated across platforms, and the Navy and industry need to co-manage.

Recommendations:
- Define what needs to be modularized, including the level of modularization, and for what purpose.
- Use commercial standards — written down and widely available — early in the design process.
- Change the prevailing culture so that interfaces will control the development of systems (weapon, sensors, etc.) — and not the reverse — based on the warship building cycle time versus control system development cycle time.
- Determine which regulations and laws have to be changed to allow acquisition across ship classes, not for just one specific class of ship.

4. What aspects of current ship design and systems integration are limiting the flexibility or responsiveness of our Combatant Commanders (COCOMs)? Are these limitations short-term in nature (day-to-day or week-to-week), or long-term (evolving or emerging warfighting requirements), or some combination of both?
Observations:
• The number of available ships, readiness, and fixed mission systems on board existing ships all limit COCOM responsiveness and flexibility; all of these have long-term characteristics and implications.
• Risk-averse procedures have resulted in a rigid, overly long acquisition process and a disconnect between operational need and acquisition time scales.

Recommendations:
• De-couple platform and warfighting capabilities to improve life cycle operational flexibility; develop ship/HM&E "trucks" (of varying sizes).
• Drive commonality in HM&E systems by mandating performance and interface standards for families of components; use commonality to force platform designers to focus on life cycle costs.
• Design mission systems for periodic refreshing.
• Integrate warfighters (as well as tactics, concepts of operations, and development groups) into the acquisition process.

The Next Steps
In addition to identifying key recommendations, another important aspect of GSES IV was to determine how these recommendations should be advanced — and by whom — and to develop a means of monitoring progress in these areas. To this end, participants volunteered to serve on ASNE-sponsored Special Focus Teams to address the two top recommendations emerging from the Summit. Their work will be facilitated by virtual meetings on a quarterly basis, as well as a face-to-face workshop at ASNE’s Fleet Maintenance and Modernization Symposium in August 2013. Both teams will issue a progress report to RADM Rowden at GSES V.

GSES V, scheduled for February 20, 2014, also will include a panel discussion in support of top recommendation #2, which entails reaching out to government and industry in allied countries to obtain their insights into the issues discussed at Summit IV. Participants on this panel could potentially include representatives from:
• Damen Shipyards Group
• Luerksen Shipyards
• GD-NASSCO
• Daewoo Shipbuilding and Marine Engineering Co.
• The Royal Danish Navy.

As RADM Rowden reiterated in his closing remarks, 2013 will offer significant budgetary and other challenges, but also the opportunity to define how the Navy will be structured and built in the 2020s and beyond. The dialogue fostered by forums such as GSES is critical in this regard, and GSES IV represented an important phase in this ongoing exchange of ideas. These efforts, which will continue in future meetings and summits, will help the Navy and industry grapple with the ship design and construction challenges in our present “age of uncertainty.”

If you have any comments on this report or recommendations for the 2014 summit, please send them to GSES@navalengineers.org.