Ship Clips - May 23, 2011

A compilation of
articles concerning the Shipbuilding Industry

From the
Congressional Shipbuilding Caucus

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Monday, May 23th,
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Navy Lays Keel For PCU Minnesota

NEWPORT NEWS, Va. -- The Navy celebrated the keel laying of Pre-Commissioning Unit Minnesota at Huntington Ingalls Industries - Newport News Shipbuilding (HII-NNS) in Newport News, Va., May 20.

In a time-honored Navy tradition, ship sponsor Ellen Roughead, wife of Chief of Naval Operations Adm. Gary Roughead, had her initials welded onto a steel plate that will be permanently affixed to Minnesota's hull. Mrs. Roughead, a former educator, has been a tireless supporter of military families and continuing education initiatives for Navy spouses.

"We are honored to have Mrs. Roughead as Minnesota's sponsor," said Capt. Michael Jabaley, Virginia-class program manager. "The keel laying marks the beginning of a special relationship between Mrs. Roughead, this submarine, and her crew. Her dedication and support of our Sailors and their families is admirable and will pay dividends for the submarine force for years to come."

Minnesota's keel-laying is the submarine's first major event since it began construction in February 2008; the submarine is on track to continue the Virginia-class program's trend of early deliveries. "Our shipbuilding partners have done an outstanding job of reducing the amount of time it takes to deliver these much-needed platforms," said Rear Adm. David Johnson, program executive officer for submarines. "Their hard work and ingenuity have helped put Virginia-class submarines with their tremendous capabilities into the hands of the submarine force at an increasing rate."

Minnesota is the tenth submarine of

the Virginia class and the last of the second, or Block II, construction contract. The submarine, like all Virginia-class boats, is being built under a unique construction contract between HII-NNS and General Dynamics Electric Boat (GDEB).

In addition to Minnesota's keel laying, the Virginia Class program will celebrate PCU California's (SSN 781) commissioning in October and PCU Mississippi's (SSN 782) christening in December. Also, for the first time in 22 years, the Navy will begin construction of two submarines of the same class in the same year when the unnamed SSN 787 officially starts construction in September.

Virginia-class submarines are designed to dominate the world's littoral and deep waters while conducting anti-submarine warfare; anti-surface ship warfare; strike warfare; special operation forces support; intelligence, surveillance, and reconnaissance; irregular warfare; and mine warfare missions. Their inherent stealth, endurance, mobility, and firepower directly enable them to support five of the six Maritime Strategy core capabilities - sea control, power projection, forward presence, maritime security, and deterrence.

(NAVY NEWS SERVICE 20 MAY 11) ... Naval Sea Systems Command Public Affairs

U.S. Ships' Deployment Shows Value of Amphibs

NORFOLK, Va. - Ten years of land war in Iraq and Afghanistan have eroded U.S. naval amphibious capability, mostly because demands on the Marine Corps curtailed training. But the U.S. Navy and Marines are working to turn that around with beefed-up training schedules this year and next, and the just-completed, wide-ranging deployment of the Kearsarge Amphibious Ready Group shows why, ARG leaders said.

The Kearsarge tied up May 16 at Norfolk Naval Station. It was followed shortly by the amphibious transport dock ship Ponce and, at Joint Expeditionary Base Little Creek-Fort Story, the dock landing ship Carter Hall. "The Kearsarge ARG conducted a broad range of missions across the entire spectrum of conflict," said Capt. Pete Pagano, the Amphibious Squadron 4 commander. "We deployed early - a month early - to conduct humanitarian assistance in Pakistan. And we finished up ... conducting combat operations in Libya" In between, Pagano said, the group launched the embarked 26th Marine Expeditionary Unit into Afghanistan and conducted maritime security, counter-piracy and counter-trafficking operations.

"So really," Pagano said, "this ARG demonstrated the full span of capabilities that U.S. naval forces bring to the fight and ... to the national interest." The ability to turn on a dime during the deployment's last two months and launch strikes over Libya, he said, "shows the flexibility of naval forces. And it ain't over 'till it's over."

Kearsarge's commanding officer said that flexibility reflected the group's intense preparation.

"I think the fact that we were ready to do all those things really speaks to the value of our training," said Capt. Baxter Goodly. "There's nothing that we did on this deployment that we didn't train to.... The sailors, the Marines were all ready, and really had kind of seen it all before."

The Libya mission, highlighted by nightly AV-8B Harrier strikes and the March 21 rescue of a downed U.S. Air Force pilot by two MV-22 Ospreys launched from Kearsarge, also served to light a fire under the group's sailors and Marines. They had been at sea for nearly seven months when U.S. and NATO militaries began pounding Libyan forces and air defense targets in an effort to defend rebel forces against Libyan counterattacks. "Once we found out we were actually going to do some real operations in Libya in defense of some defenseless civilians, the crew's morale actually picked up," Goodly said.

But when the ARG pulled into Norfolk, 8½ months had ticked off the clock since the Amphibious Ready Group had deployed Aug. 27. During one stretch early on, Kearsarge went nearly four months without a port call, Goodly said.
The deployment was newsworthy for a not-so-uplifting reason as well: the surprising April firings of the Ponce's commanding and executive officers. The chief of 6th Fleet, Vice Adm. Harry Harris, relieved Cmdr. Etta Jones for alleged multiple infractions, including poor leadership and endangering two sailors with a loaded weapon during a security drill, and Lt. Cmdr. Kurt Boenisch for failing to stand up to Jones. The results of the full investigation have yet to be released.

(DEFENSE NEWS 23 MAY 11) ... Willam H. McMichael

Pearl Harbor Docks At NASSCO For $20 Million In Repairs

The San Diego-based amphibious dock landing ship Pearl Harbor has entered dry dock at General Dynamics NASSCO to undergo $20 million in upgrades and repairs. There are now four major military vessels at NASSCO, and two Navy supply ships in different stages of construction.

NASSCO says in a release "extensive work (will) be performed to the vessel's shafting system and exterior hull" and "testing of all onboard systems and components to ensure the vessel's safe and dependable operation."

NASSCO also is performing upgrades and repairs on the frigates Curts and Vandegrift, which were placed, side-by-side, in dry dock. Work also is being done on the recently launched supply ship William McLean. Workers are months away from finishing construction of the supply ship Medgar Evers. And the keel was just laid for the Cesar Chavez, the last of 14 Lewis and Clark-class supply ships NASSCO has been building for the Navy.

(SAN DIEGO UNION-TRIBUNE 22 MAY 11) ... Gary Robbins

Navy's Newest Destroyer Departs Pascagoula Shipyard

PASCAGOULA -- For the many Huntington Ingalls Industries employees who helped build the USS William P. Lawrence, watching it sail away from the dock Thursday was emotional. "It's like one of your children leaving and going off to college," said construction manager Tommy Johnson.

The Navy's newest ship is the latest Aegis guided missile destroyer to be accepted by the U.S. Navy from the newly renamed Huntington Ingalls and is the 28th DDG 51 Class destroyer to be built at the company's shipbuilding operations in Pascagoula.

"You put a lot of pride into it and hate to see it go," said Phil Sutterfield, electrical senior specialist. "We build a close relationship with the Navy, working hand-in-hand in training them."

Cmdr. Thomas Williams is the ship's first commanding officer and will lead a crew of 300 officers and sailors.

"He has trained them well," said Johnson. "They are an outstanding crew, one of the best, if not the best, that we've worked with in this industry."

The ship will complete various certifications while out in the Gulf of Mexico over the next week before returning to port in Mobile for its commissioning. Afterwards, it will head to its destination, San Diego. The 510-foot, 9,500-ton William P. Lawrence has an overall beam of 59 feet and a navigational draft of 31 feet. Four gas-turbine propulsion plants will power the ship to speeds above 30 knots. DDG 110 honors the late Vice Adm. William P. Lawrence, who spent nearly six years as a prisoner of war in North Vietnam. He later served as superintendent of the U.S. Naval Academy.

Broadcast Clip -
Ingalls Newest, Technologically Advanced Warship Sets Sail

(WLOX ABC BILOXI 19 MAY 11) Patrice Clark

The Navy's most advanced state-of-the-art destroyer set sail from Ingalls shipyard today. As Patrice Clark reports it was a patriotic moment as the Pascagoula shipbuilders bid farewell to The William P. Lawrence ship, commander and crew.

View
Clip (RT: 1:49)

(BILOXI (MS) SUN HERALD 19 MAY 11) ... Lindsay Knowles

N.H. Senators Press for Funding For Shipyard
Modernization

KITTERY, Maine - New Hampshire's senators on Wednesday pushed Navy officials to fund modernization work at the Portsmouth Naval Shipyard. U.S. Sens. Jeanne Shaheen, D-N.H., and Kelly Ayotte, R-N.H., during a Senate Armed Services Committee hearing questioned Navy Vice Adm. William R. Burke, Deputy Chief of Naval Operations for Fleet Readiness and Logistics, on how the Navy intends to support military construction projects at the shipyard.

"A (government) report came out in November that cited several troubling examples of underfunding for maintenance at our shipyards, and they gave several examples at the Portsmouth Naval Shipyard - plywood boards replacing broken windows, mold that had been painted over because leaks hadn't been fixed," Shaheen said. "What do we need to do to address those challenges?"

Ayotte said the Navy should consolidate two phases of the structural workshop modernization project. The project is planned for fiscal years 2015 and 2016. Ayotte restated her call for the Navy to move up the project's timetable to achieve efficiencies and cost savings sooner, and Burke said the Navy would consider her request. "Portsmouth Naval Shipyard's workers are leading the way among the four public shipyards in the Virginia Class submarine maintenance which is critical to our Navy's present and future readiness," Ayotte said. "When I recently visited the shipyard, it was clear to me that consolidating the two phases of this structural workshop project would improve efficiency and save taxpayer dollars."

While Shaheen welcomed the Navy's recent announcement of its plans to invest $100 million in the shipyard, she has pointed out that no military construction funds have been allocated to the shipyard by the executive branch in the last five years. At previous Armed Services hearings with Navy officials, and in a letter to the director of the Office of Management and Budget, Shaheen has asked the Navy and Obama administration on how they intend to provide funding for these shipyard investments through other means.

(FOSTER (NH) DAILY DEMOCRAT) ...
Scott E. Kinney

East/West Divide Grows In the International Navy Shipbuilding Business

The United Arab Emirates' new corvette-class ship sat along the dock at a recent trade show. Its manufacturer, Abu Dhabi Shipbuilding, wanted to show off its indigenously built vessel and it was the main attraction at the first ever NAVDEX exhibition, a new section to the Middle East's largest arms show, IDEX, in Abu Dhabi, United Arab Emirates.

But little of what the company featured came from the UAE. The design of the planned fleet of six Baynunah-class ships originated at Constructions Mecaniques de Normandie of Cherbourg, France. The fire control and command and control for the weapon systems came from Italy. The Exocet and SeaSparrow missiles were built in France and the United States, respectively. South Africa's SAAB Avitronics supplied the laser warning system. German companies provided the decoy system, the sonar, the underwater communications and the engines. And the list of international suppliers went on.

Despite the current economic slump, the worldwide market for navy ships is expected to grow, market analysts said. Visiongain, a London-based firm, predicts global expenditures to rise 5.2 percent annually, doubling from $75.5 billion in 2011 to $124.6 billion in 2021. "In spite of the declining defense spending in the West, the procurement of major naval vessels is likely to continue," the firm's Warships and Naval Vessels Market, 2011-2021 report predicted.

The shipbuilders that came to IDEX are gearing up for the global competition. And as the UAE navy's new ship illustrated, it's not all about hulls. While there has been a lot written about the decline in the U.S. shipbuilding industry, with many yards closing up or consolidating over the past few decades, the demand remains for high-tech subsystems that turn a steel shell into a warship. "The drive towards standardization and modularization of systems is likely to offer considerable opportunities for companies that can supply such solutions," the report continued.

Daniel Harrison, industry analyst manager at Visiongain, told National Defense that there is a clear East/West divide when it comes to the naval market. Lower cost labor and materials required to build hulls is found in non-U.S. and European countries. "In contrast, the advanced western technologies that transform any hull into a formidable war fighting vessel are still predominantly supplied by western contractors. The retraction in defense budgets globally - which has had the effect of slowing the procurement of new platforms and shifting to lower cost retrofitting and upgrading or even converting existing platforms - has clearly created stronger market opportunities in this area," he wrote in an email.

Patrick N. Bright, chief analytical officer at the Seattle-based firm AMI International, said, "Indonesia can build a hull. Turkey can build a hull. They haven't taken that next step to build radar or a missile." About 60 percent of the cost of a new naval ship is found in these subsystems, he noted. While some countries may prefer to buy"all French" or "all U.S." vessel to make purchasing simpler, increasingly the world is becoming "flat," when it comes to navy or coast guard ships, analysts said. Nations like the UAE are choosing components from a virtual United Nations of suppliers.

Harrison said a good analogy can be found in the automobile world where parts are increasingly coming from a variety of global suppliers, and they all are put together in one assembly line. Indonesia, Turkey, Vietnam, Malaysia, along with the United Arab Emirates, are some of the countries that are developing their shipbuilding industries. It is a crowded field, and there is a lot of overcapacity, Harrison said. However, Bright said, "Building frigates and submarines is a totally different ballgame. So realistically, some of these countries will not be building combatants for another 20 or 30 years."

Several manufacturers came to the NAVDEX-IDEX show to see if they could crack the Middle Eastern market. Many of them were from the "East" side of the divide. All said they primarily sold their products to their home navies. Maxim Uvarov, lead specialist at Zelenodolsk Design Bureau, who manned the Russian Technologies State Corp. booth, said his home country was its biggest customer, but noted that United Shipbuilding Corporation of Russia has exported 150 vessels. Most, but not all, are former Soviet Union allies. Kuwait and Slovenia are more recent customers.

Herman Kwon, deputy general manager in Hyundai Heavy Industry Co. Ltd.'s naval shipbuilding division, was the lone South Korean representative. He didn't anticipate signing any contracts at the show. The shipbuilding giant, better known for its commercial vessels, is one of five South Korean manufacturers that vie for naval contracts with their government. That is not a lot of naval work to go around, he acknowledged. "It's not that profitable," he said. Hyundai has recently manufactured boats for New Zealand, Venezuela and Bangladesh. The company offered a hybrid patrol vessel for coast guard missions, a fast attack craft, and had literature promoting the one Aegis destroyer it has built for the South Korean navy (although it could not sell the American-made anti-ballistic missile system without the permission of the U.S. government).

S.K. Dutta, additional general manager of Garden Reach Shipbuilders and Engineers, of Calcutta, India, had a similar refrain. There are four major shipbuilders in the nation all competing for Indian navy contracts. Garden Reach offers missile corvettes, fast patrol vessels, anti-submarine craft, and a variety of support vessels. It has had a few overseas customers, namely Mauritius and Singapore. Most of the subsystems come from Russia, which has had a long military relationship with India. "We have the capacity to expand, but the modular, small ship market is saturated," Dutta said.

Bright said this about sums up the current state of the international naval shipbuilding market. There are many players, but they are all fighting over niche markets: namely the smaller countries where there is no indigenous industry. "Korea and Russia do have some export potential, but they are to places like Bangladesh, Indonesia, and places of that nature," Bright said. Even countries like Indonesia and the United Arab Emirates with nascent shipbuilding capacities will be buyers for some years because it will be decades before they can build sophisticated ships. Harrison said most of these yards will have to continue to rely on commercial ship contracts for profits.

In short, U.S. shipyards may be in decline, but no single company or country will be getting rich from building naval ships alone. And Bright didn't see any of these nations, even China, catching up to U.S. and European nations when it comes to selling lucrative, high-tech subsystems. Chinese engineers are talented at reverse-engineering anything they can get their hands on, but as long as Western countries continue to invest in research and development, they should stay one step ahead, he added. "As long as we continue to develop and stay ahead of the game, they may never catch us," he said of the Chinese. Despite the makings of a new Middle Eastern shipbuilding industry, Western companies still see the region - with its oil wealth and need to invest in weapons as a hedge against instability - as a potentially lucrative market.

Lockheed Martin came to Abu Dhabi to promote its concept for marrying the Aegis Ballistic Defense System it manufactures to its new Littoral Combat Ship. The company is one of two manufacturers of the U.S. Navy's new LCS, which is designed to operate in shallow waters and at speeds of up to 50 knots. It calls the international version of the LCS, the "Surface Combat Ship."

George Elghossain, director of international business development at Lockheed Martin, touted the ship as the "fastest combatant in the waters today." The mission modules allow for counter-mine, maritime interdiction, surface warfare and anti-submarine operations. But Lockheed Martin was there to sell the anti-ballistic missile mission concept for the vessel. Aegis is a sea-based system that is designed to shoot down short-, medium- and long-range ballistic missiles, and provide early warning through its radar. "We are also hearing, for example, that some people in the region have developed an anti-ballistic missile that can also hit a ship. So if you have a ship in the water, you need a very sophisticated weapon system and combat system to defend against" that, he said.

He also mentioned as a selling point how a U.S. Aegis-equipped ship shot down a defunct U.S. satellite in space in 2008. Elghossain acknowledged that potential customers may want to add components of their own choosing. The open architecture makes it affordable to integrate any electronic system into the ship, he said.

"As you go into the international markets, many of our customers want to use their own indigenous designed equipment," Elghossain said. The electronic architecture makes it easier, and less expensive to maintain and upgrade, he added.

It's "a very capable ship at half the price of a destroyer," Elghossain added. That may be so, but meld an LCS with an Aegis system, and it becomes an expensive boat, said Bright. "I just don't know who else other than the Saudis have that kind of money," he said. Israel considered the LCS for such a mission, then officials there started looking at the price tag and they lost interest, Bright said. Other countries that face a perceived ICBM threat such as South Korea and Japan already have Aegis systems. There are nations that have the money, but no neighbors threatening to lob missiles across their borders, he added.

Also at the show trying to drum up business for a high-tech boat was the Italian shipbuilder WASS, part of the Finmeccania Company. It had an artist's rendering of a 45-foot vessel called the Black Kite, which it described as an "ultra high speed class of catamaran" that could travel 80 knots. The design was inspired by racing boats rather than traditional navy vessels, said Filippo D'Antoni, senior vice president of sales at WASS.

It is partnering with an Abu Dhabi company, Alfattan Shipyard, to produce the boat, which is still a concept. No prototypes have been built. Like the LCS, the Black Kite is designed with an open architecture, so a potential customer could transform it to take on different missions, including anti-submarine warfare. It could carry two anti-sub torpedoes, D'Antoni said.

"We expect this country to be the launching customer," D'Antoni said of the UAE. "We have a lot of interest from many other countries." WASS wanted Alfattan's assistance in not only producing the boat locally, but marketing it in the region, he added. Boats such as the proposed Black Kite and ships such as the Lockheed Martin LCS have open architectures to allow customers to more easily add subsystems. The "plug-and-play" buzzword is easier said than done, noted Bright. Firms that specialize in integrating all these different systems will also have plenty of business if the trend continues, the analysts said.

Maurizio Di Martino, senior combat system engineer at Abu Dhabi Systems Integration, said companies like his are the ones that have the headaches when it comes to melding the communications, weapons, sensors and all the other electronic components into one ship. He was responsible for ensuring that the UAE's new corvette-class ship's components worked in harmony. "We advise. We recommend, but ultimately the UAE navy decided what subsystems to integrate," he said. "It's tough work."

(NATIONAL DEFENSE MAGAZINE JUNE 2011) ... Stew Magnuson

U.S. Navy Shipbuilder Bets On Composites

The sign outside the Huntington Ingalls Industries (HII) Composites Facility in Gulfport, Miss., states the company's optimism about the potential for advanced materials in U.S. Navy shipbuilding: "Composites, the Wave of the Future." No other facility produces composite ship structures that are similar in size and complexity to those fabricated in the Gulfport facility-at least for ships, said Michael Petters, CEO and president of HII. "It's a unique facility," he added, during an April 4 press briefing on the new company's operations.

HII-formerly Northrop Grumman Shipbuilding-is banking on the Navy continuing to use advanced composites in its vessels. The company is starting to realize, though, that the "wave of the future" is far from being a tsunami or even a significant storm surge-it's more of a building surf break. It's not that the Navy is uninterested in composites. The service sees the benefit of composites, especially for a mast, deckhouse or other parts of a superstructure, as a means of stealth, controlling weight, reducing maintenance and making it easier to modify structures for technology upgrades. "We're exploring composites, certainly for the superstructure," says Julie Christodoulou, director of the Naval Materials Div. at the Office of Naval Research (ONR).

Composites play into ONR's vision of an integrated topside, using the DDG-51 Arleigh Burke-class destroyer Flight III upgraded ship as a template. With a composite mast, says Lawrence Schuette, director of innovation at ONR, "you don't have an antenna farm," since electronics are integrated within the structure. "The Navy can reduce overall maintenance cost."

Other shipbuilding companies have also shown expertise in building small craft out of composites that are suitable for military operations. One of the most popular exhibits at the Navy League Sea-Air-Space Symposium and Exhibition in Washington last month was the Piranha carbon-composite unmanned surface vehicle from Zyvex Technologies of Columbus, Ohio. Measuring 53 ft., 8 in. long with an 11-ft., 7-in. beam, the boat has a draft of 2 ft., top speed of 45 kt. and a gyro system that keeps it steady in Sea State 6.

But despite its promise, composite construction is costly for most major shipbuilding. The Navy studied using composite materials to replace aluminum superstructures prone to cracking on its cruiser fleet, but decided the replacements would be too costly, says Scott Hale, Naval Sea Systems Command deputy program manager for in-service surface combatants. "If the Navy had enough money to put composites there," Hale said during the Navy League SAS, "we would put them in there."

The Navy and HII learned how expensive composite construction can be in building the DDG-1000 Zumwalt-class destroyer, whose deckhouse is made from composites. The Zumwalt is arguably the Navy's most futuristic ship. Apart from the composite deckhouse, there are plans for advanced dual-band radar and electric-drive propulsion.

To test these capabilities, HII built a replica of the composite deckhouse and transported it by barge to the Navy's radar-testing site at Wallops Island, Va. Navy research money funded the unique test facility, adding to the Zumwalt's price tag-the lead ship alone is projected to cost more than $3 billion. Zumwalt shipbuilders say that even though the number of vessels in the class was cut, to 3 from 24, the ship represents the future of Navy ship construction. The design of the ship-especially the use of deckhouse composites-will pay dividends when it comes to lifecycle costs.

HII sees the Zumwalt work as a natural progression for composites. The company made composite masts for the most recent LPD-17 San Antonio-class amphibious transport dock ships. It also built composite topside structures for the CVN-77 Bush and CVN-78 Ford aircraft carriers.

HII built fabrication hangars to handle Zumwalt work. The DDG-1000 deckhouse structure is double the width and five times the height of the San Antonio-class masts. The biggest panels, which are fiber-reinforced, take more than 24 hr. to infuse with resin and to cure. HII uses conventional composite industry processes and also developed its own to fabricate the components of the structure, and to inspect each finished piece with ultrasound equipment.

(AVIATION WEEK 17 MAY 11) ... Michael Fabey

Shipyard Pursuing Cost-Cutting Measures for Next-Generation Ballistic Missile Submarine

One of the Navy's most expensive purchases - the next-generation ballistic missile submarine - is still years away, but a shipyard is working on the preliminary design with an eye towards shaving close to $1 billion off the expected $5.7 billion price tag. The Navy currently operates 14 ballistic missile submarines capable of carrying up to 24 Trident II D-5 missiles each. Designed for a 30-year service life, the first submarine of the Ohio-class fleet will retire in 2027 after more than 40 years of service.

Beginning this decade, the Navy will initiate a program to replace the submarines. The service's long-term shipbuilding plan reflects a total buy of 12 boats, with the first new boomer to be procured no later than 2019. The second boat will be bought in 2022 followed by the next seven submarines starting in 2024. The final three will be acquired in the early 2030s.

The Congressional Budget Office has estimated that the total cost for the entire class is $99 billion. While detailed design work for the new ballistic missile submarine commences in 2015, the initial research and development effort is under way at General Dynamics Electric Boat, which designed and developed the 560-foot Ohio-class submarine in the 1970s.

Officials at Electric Boat say that they are aiming to reduce the Ohio-replacement class costs so that the price per hull is closer to $4.9 billion for the second through 12th boats. To do that will require wringing out costs and lowering the price on government-furnished equipment, said Kevin Poitras, senior vice president for engineering, design and business development at the Groton, Conn.-based shipyard. About 60 percent of the overall cost lies within the yard's control. The remaining 40 percent falls into combat systems and weapons that the government will procure separately. "Getting to $4.9 billion will be a combination of how well we get the manufacturing plan done, and the material that goes in the boat," Poitras said. "The material that you buy - the pumps, valves, raw materials - probably makes up 75 percent of the cost."

Innovations in ship construction can help cut costs, he added. Electric Boat engineers who worked on the Ohio-class submarine pioneered a modular construction process where ships are built in large sections, or blocks, that are fully outfitted and then connected and welded together. The concept since then has been applied to a number of ships, including the Virginia-class attack submarine currently being built under a teaming arrangement between Electric Boat and Huntington Ingalls Industries, formerly Northrop Grumman Shipbuilding in Newport News, Va. Virginia-class submarines are being assembled in four 2,000-ton modules.

On the Ohio-class replacement program, Electric Boat engineers are looking to construct the submarine in even larger modules. Also under consideration is altering how some of the parts are built, said Poitras. One of the biggest changes involves fabrication of the missile compartment. When the original Ohio-class submarines were built, the entire hull was constructed first and then workers cut a hole in the steel to install the missile tubes.

"Now, we're going to pre-fabricate a number of missile tubes and put them into a smaller ‘quad-pack,'" explained Poitras. The quad-packs will be joined to form the missile compartment. Workers would then install the completed compartment before the hull is welded together in final assembly. "We think that will save a year and a half in construction time. That's significant," Poitras said.

That effort, like some other new processes under consideration, is so radical a change that the yard will have to test prototypes in order to validate the concept before the program commits to it, he added. The yard is working with the Navy to develop the technical specifications for the ship. "As you set requirements and you draw out the initial system schematics, by that time you've defined about 70 percent of the costs," said Brian Wilson, the sea-based strategic deterrent program manager at Electric Boat. During the next two years those costs will become fixed as the design phase of the submarine proceeds, Poitras added.

How much the Navy will have to pay to operate and maintain the boat throughout its 30-year service life also is a concern. "The ideas have to be good ideas that save money in design, construction and lifecycle costs. ... That's an actual challenge," Wilson said. "Often, you can go spend money up front to save money downstream in the lifecycle, but we're trying to balance all three and drive all three [costs] down at once." Navy officials have stated that they are expecting a 10-percent reduction in lifecycle costs in the new Trident program. That creates an incentive to reuse parts and components from the Virginia-class submarine program, Wilson said.

Shipyard officials speculated that the Navy might opt to buy the Ohio-replacement submarines in two large "block buys" of five boats each, after the first-of-class ship is built. Navy officials recently announced that the service is looking at possibly overlapping two Virginia-class block buys with two Ohio-replacement block buys. "That's a lot of volume that you could conceivably make use of in competition," Poitras said.

But the yards will have to ensure that every shared component has the reliability that a strategic deterrence platform needs to conduct its missions. If parts fail, they will have to be quickly repaired or replaced at sea - a standard that is more stringent than the requirements for maintaining fast-attack submarines. "We're having to remind people of what that means and how important it is," Wilson said.

The Navy's program office has hosted visits and given shipyard officials opportunities to talk to sailors on Ohio-class boats and to the maintainers at submarine bases and repair facilities. "They see the problems and the solutions, so we can incorporate them into what we have here," Wilson said.
Shipyard officials also are working with the Navy's missile, naval reactor and propulsion communities. "Everyone has the same objective: a good quality product. But we have to meet these cost goals, which is going to be a challenge," said Poitras. "It's going to take balance and innovation. To do that, we're at the shipyard changing our design processes."

Officials said the yard might feed electronic design data directly into the manufacturing side of the operations to expedite and facilitate construction while lowering costs.

"There's really not a lot of margin left to get this ship built and put out on its first patrol. We'd really like to keep on the pace we're at because we want a high level of design completion to start the construction," said Poitras.

When construction commenced on the Virginia-class submarines, the design was about 45 percent complete. The target for the Ohio replacement is at greater than 50 percent complete to attain the cost goal.

"We're already investing in quite a few vendors to make sure that their design, the prototypes and their qualifications support the in-yard need date of the boat," said Wilson. "That boat has to deliver when the first Ohio-class ballistic missile submarine comes offline. It is all intricately tied into a big schedule."

(NATIONAL DEFENSE MAGAZINE JUNE 2011) ... Grace V. Jean