Navy Submarine Programs Facing Many Pressing Challenges, Deadlines

ARLINGTON, Va. – The Navy's submarine production enterprise is besieged by growing demands as it moves Virginia-class construction to two a year, is building payload models for future Virginias and is designing new models, and is working on refueling some of the Los Angeles-class attack boats, while focusing on the No. 1 priority – keeping the Columbia-class program on the tight schedule to replace the aging Ohio-class boomers.

On top of all that is the urgent requirement to overcome the "debacle" of faulty welding in new ballistic-missile tubes that will impact the narrow schedule margin to meet the Columbia's firm 2031 start of patrols, and the possibility that Virginia production could be increased to three a year in the near future.

Adding to that staggering array of challenges described by the top submarine program officials Nov. 7, the Navy program managers and the sub building industry are confronted with a need to not only expand their workforces to meet the growing demands, but to find new skilled builders and designers to replace an aging cadre of workers.

But during their presentations at the Naval Submarine League's annual symposium, the Navy officials returned repeatedly to the crucial requirement to have the first Columbia-class ballistic-missile submarines ready for their nuclear-deterrence missions before the current Ohio-class boats hit their already extended service life.

"We're doing everything we can to deliver Columbia on patrol, on time," said George M. Drakeley, executive director in the

submarine program executive office. “Beside keeping the Columbia program at an affordable cost, “our biggest challenge is to deliver on time.”

History shows that the first of class in any ship program does not deliver on time, Drakeley said, noting “We don’t have that luxury.”

“It’s very important we get the Columbia out by 2031 as the Ohios retire,” he said, because “we’ve extended the Ohios [service life] from 30 to 42 years.”

Navy officials have said that they cannot guarantee that the oldest of the Ohio boomers would be able to submerge for a strategic patrol after 2031.

Earlier in the day, Adm. Frank Caldwell, director of Naval Nuclear Propulsion, showed the importance of the Columbia program by noting the ballistic-missile submarines were “the only survivable component” of the nuclear deterrent triad and would carry 70 percent of the warheads allowed by the New Start treaty with Russia.

Capt. Jonathan Rucker, program manager for Columbia, said they were “in full swing” with detailed design and advanced procurement underway and would be ready to start construction in 2021. In addition to focusing on keeping on schedule, Rucker said, “to ensure the Navy gets 355 ships … we need to get Columbia down to an affordable program cost.”

To do that, he said, “my staff is working on how to get to ‘no,’ which means don’t change requirements.”

To get a head start on Columbia construction, the program started production of the common missile compartments, which also will be used in the Royal British Navy’s Dreadnaught ballistic missile submarines.

But last summer, inspectors discovered “this missile tube

debacle," he said, referring to a large number of substandard welds. The program office is working with industry to address the flawed welding and to impose a more stringent oversight regime, but correcting the flaws has taken 10 months from the schedule.

Capt. Christopher J. Hanson, program manager for the Virginia submarines, noted that they were now steadily producing two boats a year, were building the first of the Virginia Payload Modules, which will increase the boats' strike capabilities, and were working on designs for improved future versions.

And Drakeley noted that "Congress has put into law" the requirement to negotiate with industry on increasing the construction rate to three a year, which might happen by 2022 or '23.

Meanwhile, they are working on ways to refuel the nuclear reactors on five of the older Los Angeles-class attack boats to extend their service lives as part of an effort to expand the sub fleet from 48 to 60 to meet the demands from regional combatant commanders.

Panelists Argue Current Pentagon Spending Conflicts with Likely Future Needs

WASHINGTON – The Pentagon has a serious problem in that providing what it needs for the forces to be ready for current and likely near-term conflicts can clash with what it requires to prepare for the return of great power competition, a panel of former civilian defense officials and current military

officers said.

In a Nov. 2 forum on military readiness at the Brookings Institution, the debate was framed by the questions of “ready for what?” and “ready for when?” These raised the conflict between increasing current readiness for the low-level fights against extremists and modernizing for great power competition with Russia and China.

The two former senior defense officials agreed that what the military is buying with the recent significantly higher budgets is not what it will need to confront Russia and China.

Mara Karlin, whose decades of Pentagon service ended as deputy assistant defense secretary for strategy and force development, criticized the Navy’s drive for a multipurpose 355-ship fleet when it should be focusing on increased undersea capabilities that would give it a competitive advantage against the emerging peer adversaries.

Karlin also questioned how much the Marine Corps is spending on aviation, which is focused on reversing a currently low readiness condition, and called the Air Force’s spending portfolio “totally messed up.” She did like the thrust of the Army’s newly created Futures Command, which appears aimed primarily at acquiring the capabilities it would need to counter peer competitors.

“There are all kinds of ways we’re not spending on what we need,” Karlin said.

Alan Estevez, whose 36 years in the Pentagon ended as principal deputy undersecretary for acquisition, technology and logistics, said the current enlarged budget “is buying what was in the pipeline, which probably are not the right things.”

There is not enough in research and development for things like lasers and hypersonics, he said, and “we have to be

prepared to fight with 1s and 0s, cyber. We do not have the tools, the modernization, required for great power conflict."

Karlin and Estevez agreed that the new National Defense Strategy presented by Defense Secretary James Mattis was "spot on" in its declaration that the top mission of the military was preparing for the return of great power competition, naming Russia and China.

Two federal executive fellows at Brookings, Marine Col. Amy Ebitz and Navy Cmdr. Brendan Stickles, focused on their service experiences, particularly noting the negative impacts of the years of constrained budgets under the threat of sequestration and the inefficiencies imposed by the years of continuing resolutions instead of on-time appropriations.

Stickles, an electronic warfare pilot who recently commanded an EF-18G Growler squadron, cited the report several years ago that only one-third of the Navy's FA-18 Super Hornets were combat ready. Although "we've made progress" with just over now ready, "that's not a good statistic."

He also pointed out that early this year there was no aircraft carrier at sea, which required a B-2 bomber to fly from Missouri to drop a bomb in Afghanistan, "a job that should have been performed by a carrier."

Ebitz, whose career has been in law enforcement and force protection, said that compared to the current enemy, the Marines "absolutely are ready. They're out there every day doing what is required." But, she said, the high operational demands and the past budget constraints have hurt the Corps' ability to prepare for the future.

"It goes to the 'ready for what?'" she said. "We haven't always been accurate on that. We not only have to be ready for today, the anti-terrorist fight, but for the future," she said.

Ebitz said the Marine Corps' priorities are "increasing our own lethality, building partnerships and ensuring the flow of equipment." But most important, she said, "was our personnel," giving them more time between deployments to spend with their families and train for the future fight.

Dunford Encouraged by Afghan Security Forces in Latest Afghanistan Strategy

ARLINGTON, Va. — The nation's top military officer argued that the U.S. military role in Afghanistan was necessary to protect the U.S. homeland from violent extremists and that the strategy was working in the sense that Afghan security forces were carrying the fight, not Americans.

Joint Chiefs of Staff Chairman Marine Gen. Joseph Dunford said if he thought it was in America's interest to withdraw U.S. forces, he would have recommended that, but did not because he believed it was essential to homeland security.

As far as justifying the continued presence to U.S. forces making multiple deployments after 17 years of conflict in Afghanistan, Dunford said, "I'm not promising anything other than this is not what we did 2015," before the new strategy was adopted. The 15,000 U.S. and coalition forces in Afghanistan are not leading the fight. "We are providing support to Afghan security forces," he said.

Addressing an Oct. 26 conference held by military reporters and editors at the Navy League headquarters, Dunford said the drive to end the war in Afghanistan had three tracks —

military and political pressure on the Taliban to convince them they could not win and religious and social pressure from Afghans.

“We need to continue doing what we’ve been doing to support the Afghan security forces. … But it would be a mistake to focus on the military aspect,” he said.

On another current issue, Dunford said no mobilization orders have been given to send active-duty forces to the Mexican border in anticipation of the convoy of Central American asylum seekers moving north through Mexico and he only knew of the plan for 800 such troops from the news media.

Asked whether he was concerned about the continued cancelation of U.S. exercises with South Korean forces, Dunford hedged a bit, saying they had to balance the security risks of not holding the regular joint exercises against supporting the diplomatic efforts to denuclearize North Korea. The military’s focus was on supporting Secretary of State Michael Pompeo’s negotiations, he said.

On broader issues, Dunford said the Defense Department could not assume it would continue to receive higher funding, as it did the last two years, and had to focus the expected limited resources on developing the forces it would need to confront the return of great power competition and to modernize the force to reverse the erosion in the U.S. strategic advantage against Russia and China.

He said decisions on how to prioritize spending would be shaped by a planned series of exercises and wargames.

Dunford said the recent increases in defense funding have enabled the military to fix the readiness problems “that can be fixed by money” but noted the need to substantially increase the size of its cybersecurity components. To get the skilled people needed, he said the services would have to change some personnel policies, such as allowing easier moves

between active and reserve components and allowing people who wanted to specialize in cyber to remain in those jobs without the usual rotations into other jobs now considered necessary for career development.

Changing Global Security Environment Challenges U.S. Logistics Advantage

NATIONAL HARBOR, Md. — The United States' ability to project military power on a global scale is an "unparalleled" strategic advantage, but that capability is being challenged by the rapidly changing global security environment, cyber threats to defense command and transportation management networks, and a badly aged sealift fleet, senior logistics and transportation officials said Oct. 23.

The extent of the threats was highlighted by Army Gen. Stephen Lyons, commander of the U.S. Transportation Command (TRANSCOM), who quoted former Pacific Fleet commander Adm. Scott Swift saying: "If we forget about logistics, we can forget about victory."

The responses to those challenges include greater coordination and integration of the multiple service and national defense transportation and logistics operations, intensified cyber security efforts within TRANSCOM and its industry partners, and a three-pronged program to recapitalize the Maritime Administration's and the Military Sealift Command's fleets.

In a video presentation to the annual conference jointly sponsored by TRANSCOM and the National Defense Transportation

Association, an industry-oriented organization, Lyons said: “Our ability to project military power at a time and place of our choosing is a strategic advantage unparalleled in the world.”

But, he said, the new National Defense Strategy warns that the rapidly changing global security environment “challenges the traditional assumption that the joint global logistics network will operate with impunity.”

Delivering the keynote address for his boss, TRANSCOM Deputy Commander Marine Lt. Gen. John Broadmeadow said the command’s mission “depends on our end-to-end global logistics network, a systems of systems” with multiple modes of transportation and an integrated command and control system.

Although that global transportation network has been tested in the past, “the challenges of tomorrow will require a new approach, because the problems have become more complex, more nuanced,” he said.

Broadmeadow noted how dependent the command is on its service and industry partners and said, our adversaries seek to exploit “the cyber vulnerabilities” where the military and commercial networks meet.

To counter that, the command is moving aggressively into the cloud to protect its data and the transportation management system, he said. It also has added contract requirements for its commercial partners to conduct cyber security assessments and to report any cyber intrusions to TRANSCOM.

“We also must ready our organic sealift fleet for the future fight,” he said, noting that by 2034, 54 of the 76 organic sealift ships will average 60 years old. “We cannot wait until then to take action on recapitalizing our fleet.”

To address that problem, TRANSCOM and the Navy have agreed on a three-pronged program that would extend the service life of

some of the current vessels, buy retired commercial ships that would be modified and updated in U.S. shipyards, and build new vessels in U.S. yards, he said.

Recent congressional defense budgets actions have authorized life extensions for 31 existing ships and purchase of two of the 26 planned used commercial vessels. Funding for construction of 10 new ships is anticipated, he said.

“Ultimately, we will create a balanced approach to delivering our combat power,” Broadmeadow said.

Retired Rear Adm. Mark Buzby, administrator of the Maritime Administration, amplified the problem with the aged sealift fleet, saying the cost to maintain the ships “has skyrocketed” and they had to take one ship out of service because they could not afford to fix it.

Although the plan to recapitalize the fleet is good, Buzby observed that the Navy “will be challenged by a number of funding challenges,” including replacing the Ohio-class ballistic missile submarines.

Busby also detailed a new program to build new training ships for the six state-run Merchant Marine academies, which currently are using badly outdated vessels. The program provides for hiring a commercial construction manager who will contract with a shipyard to design and build the ships and be paid when they are turned over to the Navy.

Naval Aviation Leaders:

Readiness Improving, but ‘Still Not Where We Need to Be’

WASHINGTON – The combat readiness of naval aviation is improving, but it is not where it needs to be, the Navy and Marine Corps top aviation leaders said Oct. 5.

Vice Adm. DeWolfe Miller, commander of Naval Air Forces, said his readiness has increased from the one-third availability reported by his predecessor a year ago, “to about 50 percent, on average. We’re still not where we need to be.”

“I have 260 airplanes [ready] on average. We need 341,” Miller told a Center for Strategic and International Studies forum.

Miller noted that when he was director of Air Warfare in the Pentagon last year, the feeling was they could fix readiness quickly and move on to modernizing the force. When he moved to the fleet as air boss, he said, “we found the hole is a little bit deeper than we thought.”

But, Miller said, “the entire naval air enterprise is being aligned toward this recovery,” and there is “a sense of urgency” throughout that enterprise.

After a lot of analysis by industry and military experts, “It comes down to people and parts,” he said.

Marine Lt. Gen. Steven Rudder, the deputy commandant for Aviation, had a similar conclusion on what it will take to fix the Corps’ aviation readiness, which had been lingering around 25 percent in some aircraft types.

Rudder did not give a readiness number, saying the Marines used different metrics, but said the Corps made a decision that they needed to “fully fund the accounts for keeping

aircraft up, and we did." He said they gave money to the supply system to buy the parts required, to the Fleet Readiness Centers and aviation depots that repair aircraft, and to the program managers so they could "help a particular community to get out of the hole."

He said later that they were taking steps to reverse personnel decisions made when the Marines were reducing end strength and created shortages of experienced maintenance noncommissioned officers on the flight lines.

And, he said, "we put money back into the flight-hour program so we can fly. We're not where we should be, but we are seeing some increases" and "seeing higher percentage of up aircraft."

Rudder said Marine pilots had averaged 13.5 hours a month in fiscal 2016, 15.4 hours in fiscal 2017 and "we're closing out '18 averaging 17.9. Our readiness is creeping up. It will take time, because some of our aircraft are old. … But we're moving in the right direction."

Asked about complaints about the material condition of the new F-35Bs they are receiving, Rudder acknowledged that he was not satisfied with the quality of some of the planes delivered by Lockheed Martin.

But, he said, "if the taxpayers give the Marine Corps new airplanes, we're going to use them."

He noted that the Corps has 33 operational F-35Bs, and 22 are forward deployed in Asia, and in the Central Command where the Marine Lightning IIs reportedly conducted their first combat missions.

Miller said the Navy's first squadron of carrier-capable F-35Cs was in transition and expected to make its first deployment in fiscal 2021. He said the Navy was preparing for that deployment by using tactics developed by the Top Gun air combat training unit and applying lessons from the Marines'

experience with their F-35s on the amphibious ships to the F-35s.

Both of the aviation leaders said they no longer used old metrics of whether aircraft were “full mission capable” or lower readiness status.

“It’s going to be very simple. We’re going to have an airplane that’s ready to fight, or it’s not,” Miller said, adding that the aircraft being deployed are the best they can be.

And both listed a variety of programs they are using to retain qualified pilots, including a new Navy program that would allow some midgrade aviators to opt out of the normal quest for command positions and remain as “permanent pilots” in training units.

Modly: Unmanned Systems ‘Huge Priority’ in Building a Bigger Fleet

WASHINGTON – When talking about the future fleet size, the Navy’s No. 2 civilian leader says he calls it “355-plus,” with the “plus” meaning a lot of unmanned systems and other innovative things not normally considered part of the fleet.

“Unmanned is a huge priority for the Navy,” which is looking at a range of systems to take advantage of the “huge advances in unmanned” technology, Navy Undersecretary Thomas B. Modly told a Defense Writers Group breakfast Oct. 4.

Despite that push to add unmanned systems, Modly said there is no quota or goal for the share of the fleet they will fill.

“We are definitely on a path to building a bigger fleet” and it will include “a bigger integration of unmanned.”

The Navy and Marine Corps already are fielding a large number of unmanned air and ground vehicles and surface and subsurface vessels, and are developing larger and more capable systems. The Navy recently awarded a contract to Boeing to produce the MQ-25 Stingray, a carrier-based unmanned aerial refueling jet, and the Marines want a large Group 5 unmanned aerial vehicle that can operate from amphibious ships.

Modly said a new Navy force structure plan should go to Chief of Naval Operations Adm. John Richardson and Navy Secretary Richard Spencer next month and probably would be released early next year.

A lot of things have changed since the last plan was released in 2016, he said, including the build-up of Chinese capabilities and activities in the Pacific, how unmanned systems would fit in and the effect of the planned new frigate on the force of small surface combatants.

Modly said the larger fleet obviously would require more Sailors. Asked whether there were concerns that those plans to add personnel would hit the same problems the Army suffered when it fell 6,500 short of its recruiting goal in fiscal 2018, he conceded the Navy “was going to face the same challenges.” Recruiting always becomes more difficult in a “hot economy” with low unemployment rates, he said.

“We always have to make the case that the Navy is a good place to start a career,” with its training opportunities, and “the ships are more comfortable to live in” than when he served in the Navy several decades ago.

Modly said the Navy was making a maximum effort to improve the sustainability of its ships and aircraft, with investments in the shipyards and a focus on improving the maintenance and supply of spare parts for the F/A-18s, which suffered badly

during the years of tight budgets.

He did not believe that the emerging “dynamic deployment” concept would interfere with the planned maintenance cycle for ships, like a similar aggressive deployment plan a decade ago that had caused an epidemic of unfit ships. The ships would make their six-month deployments as scheduled so they could meet the planned maintenance periods, he said.

But what the ships would do during that deployment will be different, he said, noting the recent unusual activities of the USS Harry S. Truman battlegroup.

The “dynamic deployment” concept was proposed by Defense Secretary Jim Mattis who said U.S. forces should be strategically predictable but tactically unpredictable.

Modly recently returned from an extensive tour of many of the small island nations in the Pacific. He said the impression he gained from their leaders was a strong desire for more U.S. presence, including port visits, and help in improving their capabilities to monitor their territorial waters.

Rising Accident Rates Taking Toll on Navy, Marine Aircraft Availability

RENO, Nev. – The accident rate for the major Class A mishaps in naval aviation is “trending up” and there has been a “major increase” in the more minor Class C accidents, which is aggravating the lack of aircraft availability the Navy and Marine Corps have been struggling to overcome, the Naval

Safety Center commander reported.

The naval services are taking a series of steps to reverse the jump in Class C mishaps and aggressively working to develop better analytical tools to help prevent the major accidents, which result in the loss of aircraft or personnel or multi-million dollars in damage, Rear Adm. Mark Leavitt said Sept. 8.

Also, following a year-plus of multiple studies and corrective actions, naval aviation has made "good progress" in stopping the surprising increase in physiological episodes, or apparent shortage of oxygen in flight. "But it does remain our No. 1 safety concern," Rear Adm. F. R. "Lucky" Luchtman, the head of the recently created Physiological Episode Action Team, said at the same forum during the annual Tailhook Convention of aircraft carrier aviators.

Leavitt said the Class A accidents in naval aviation this year have "exceeded last year's numbers," with 14 mishaps. "The rate is trending up."

The Marines, however, "are doing much better this year, down to five" Class As, compared to 12 last year, he said.

Although some members of Congress have blamed the higher Class A rates to the age of aircraft and poor maintenance due to the budget reductions, Leavitt said the accident investigations are "still finding between 60 to 70 percent causal factors are human errors. We've not seen a spike of material problems."

In the Class C mishaps, "this is not a good news story," Leavitt said, but did not provide numbers for what he called a "major increases."

Although the C mishaps inflict damages costing a comparatively low $50,000 to $500,000, they can take an aircraft out of service for months, which is aggravating the problems of too few available planes, he said.

Service studies have attributed the increase in the aviation version of fender benders to violations of established procedures by squadron maintenance personnel, which may reflect a lack of experience in the midgrade enlisted maintainers because of faster advancement in rank during a drive to keep more Sailors in service, he said.

The studies also indicate a “breakdown in team work,” which has led to efforts to get more “khaki leadership out on flight line, the flight deck,” Leavitt said, referring to chief petty officers and commissioned officers.

In an effort to reduce the major mishaps, Leavitt said the Safety Center has created a new office focusing on developing analytic tools to provide more data on causes and related factors, which can be shared with squadron commanders to help avoid accidents, he said.

The physiological episode team Luchtman leads is attacking the alarming number of incidents in which pilots in the F/A-18 Hornets and Super Hornets, EF-18G Growlers and the T-45 and T-6 training aircraft have reported in-flight conditions similar to hypoxia or oxygen shortage.

Luchtman said intensive studies by the Safety Center, NASA and others led to some modifications to the aircraft oxygen supply systems and indications that poorly fitted pilot’s equipment cause some of the incidents.

They also are adding systems to the aircraft that can measure the quality of oxygen being provided to the pilots, he said and are seeking even better devices to monitor the oxygen flow. They are working with the Air Force and allies who fly similar aircraft and have had some of the same problems.

Industry Offers Alternatives to Achieve 38 Amphibious Warships, Recapitalize MSC Fleet

QUANTICO, Va. – Three of the Navy's biggest shipbuilders offered alternative plans they said would enable the Navy to get the 38 amphibious warships it needs and to recapitalize the Military Sealift Command's (MSC) ancient fleet faster and cheaper than what the Navy now plans.

Their proposals included moving up construction starts for the two newest classes of amphibious ships, to avoid creating a cold shipyard, to gain the efficiency of block buys, and to drop the concept of a single common hull design to replace all of MSC's widely different ship classes and instead adapt several of the amphibious and auxiliary ships currently being built.

Speaking Aug. 9 at the closing day of the Seabasing Operational Advisory Group's 2018 session, the officials from Huntington Ingalls Industries (HII), General Dynamics NASSCO and Austal also agreed that the U.S. shipbuilding industrial base is capable and ready to make the major increase in construction that would be necessary for the Navy to reach its goal of a 355-ship fleet.

They were joined in that view by Jeff LeLeux representing Swiftships, which builds a variety of patrol craft and has the contract for the Landing Craft Utility 1700, formerly called the ship-to-shore connector program.

Congress and others have expressed concern that the industry could not ramp up production enough to help the Navy reach its 355-ship goal.

Jon Padfield of HII said the “amphibious ship availability doesn’t seem to be getting any better and may be getting worse,” despite the Navy’s commitment to meeting the long-standing requirement for 38 amphibs.

To avoid making the situation even worse, the Navy should accelerate construction start on LHA-9, the fourth in the America-class amphibious assault ships, and the LPD-17 Flight II replacements for the aged Dock Landing Ships, Padfield said.

The first three America-class LHAs are operational, being built or set to start construction next year, he said. But there is a multi-year gap between construction of LHA-8 and the planned start for LHA-9, which would force HII to close the line. “In order to keep the production line hot and to get to 38, we need to accelerate LHA-9,” Padfield said.

He also said the Navy could save money by moving up production of LPD-31 and 32, the second and third of the Flight II ships, formerly called LX(R).

General Dynamic’s Tom Wetherald and Austal’s Larry Ryder criticized the Navy’s proposed Common Hull, Auxiliary Multi-purpose Platform (CHAMP) concept to replace MSC’s fleet, which includes maritime prepositioning (MPS), strategic sealift, crane, Marine Corps aviation maintenance, submarine tenders, command and hospital ships.

Wetherald said the CHAMP concept made sense for the large MPS ships, but suggested the expeditionary transport dock and expeditionary seabase ships that NASSCO builds would be better fits for other types. He joined Ryder in proposing variations of Austal’s expeditionary fast transports as more reasonable forms for other MSC ships.

They also proposed the LPD class as a better platform for some of those auxiliary ships than the CHAMP idea, to which Padfield nodded agreement.

Later in the day, two MSC officials highlighted the problems the command has with its outdated fleet, most of which are steam-powered, which are difficult to maintain and take larger crews to operate. But they indicated they had not been involved in creating the CHAMP concept.

Hypersonic Technology Becomes a Top Pentagon Priority

WASHINGTON – Although hypersonic technology originated in the United States, “we didn’t choose to weaponize it, but now we have to,” the Pentagon’s top technology official said Aug. 1.

“The enemy gets a vote. They have chosen to weaponize hypersonic,” Michael D. Griffin, the undersecretary of defense for research and engineering, said.

To respond to that emerging threat, the Pentagon has made regaining the advantage in hypersonic technology one of its top priorities and has brought the three military departments together in a multiservice effort to develop hypersonic weapons, Griffin told a briefing sponsored by the Senate Aerospace Caucus.

“We want to have some of our first hypersonic strike weapons fielded in the early 2020s,” and are working to meet Defense Secretary James Mattis’ “goal of dominance by 2028.” That means an air-breathing” hypersonic weapon capable of a “prompt conventional strike: that can “hold an enemy at risk,” he said.

Hypersonic generally means an air vehicle that can reach and sustain speeds of at least Mach 5, or five times the speed of

sound, which could be more than 3,000 miles an hour.

Griffin said he was not prepared to say what form of hypersonic vehicle they would have by 2028, whether it would be solely an expendable weapon, or an aircraft that could carry and release guided munitions and return, and whether it would be manned or unmanned.

Each of those variables raises the technological challenge to the quest.

But by using the term “air-breathing,” Griffin is ruling out the simplest solution, a rocket-propelled missile that would have relatively limited range.

Robert A. Pearce, deputy associate administrator for strategy at NASA, noted that while the agency has close ties with the Pentagon, its main focus is on commercial use of technology

“Our primary concern is reusable systems,” Pearce said.

Congress has been increasingly vocal in its demands that the Pentagon match or exceed the hypersonic capabilities of potential adversaries.

Griffin noted that international media has reported that China has successfully tested hypersonic vehicles multiple times and that Russian President Vladimir Putin bragged on Russian television of advances in hypersonics.

That is why hypersonic weapons, along with offensive and defensive cyber, was among the top priorities Mattis gave him when he took the new technology and engineering job, Griffin said.

Those technologies are important, “because much of the world is catching up” and eroding the technological advantage that the U.S. military has had in conflicts since World War II, he said.

The United States would not win a “man-to-man engagement” with our potential adversaries and “we don’t want to engage in that kind of fight.”

The way to prevent that kind of battle is to regain the technological advantage with prompt conventional strike, electronic warfare, directed energy, cyber and space, Griffin said.

“Those are the high-leverage priorities that will allow us to regain the advantage,” and “when we appear to be so strong, people will not want to engage us. That’s the best way,” he said.

Courtney Urges Pentagon to Keep Columbia-Class Funding Separate

WASHINGTON — The provision for separate funding for the Columbia-class ballistic-missile submarine program is not being followed by Pentagon budget officials, which could “put tremendous pressure on the rest of the shipbuilding account,” the top Democrat on the House Armed Services Seapower and Projection Forces subcommittee said July 24.

Rep. Joe Courtney, D-Conn., noted that in 2014 he and former Rep. Randy Forbes, R-Va., then-chairman of the Seapower panel, introduced legislation to create the National Sea-based Deterrent Fund to provide funding for the Ohio-replacement submarine.

“We proposed to take funding for the Columba-class program out

of the shipbuilding account as a way of taking the pressure off the rest of the Navy's fleet, that was under its own pressures due to the existing [budget] top lines," Courtney told a Mitchell Institute breakfast.

The legislation was passed and still is law, he said.

"But the real question is whether the Pentagon will treat it as really a separate account," he said.

Right now, Columbia still comes out of overall pie that pays for shipbuilding.

"It's still got issues as far as the budget folks over in the Pentagon," said Courtney, who represents a Connecticut district that includes the New London submarine base and the Electric Boat submarine construction yard.

Currently, funding for Columbia is relatively low, paying for final design and fabrication of the missile compartments. But with an estimated price tag of more than $7 billion each, paying for Columbia construction would "put a big hole in shipbuilding," he said.

Full construction of the first Columbia is scheduled to start in fiscal 2021. A total of 12 are planned, to replace the 14 Ohio-class boats that are nearing the end of their service lives.

"This has been a totally a non-contested issue," Courtney said.

There have been a lot of complaints about the enormous cost of the entire program to modernize all three legs of the nuclear deterrent triad, with the Air Force working to replace its Minuteman III intercontinental ballistic missiles and buying the B-21 bomber to replace the B-52s and B-2s in the nuclear delivery mission.

But, Courtney said, "the sea-based deterrent, I think, is the

least-contested leg of the triad.”

He noted that the compromise version of the fiscal 2019 National Defense Authorization Act was approved by House-Senate conferees the previous evening and probably would be passed in the House on July 26.

The bill provides “roughly $3 billion,” for Columbia detail prototyping and construction of the missile compartments, which also will go into Great Britain’s new ballistic-missile sub, the Dreadnaught, Courtney said.

“The program is moving forward. Our biggest problem is to prevent any slowing down,” because the Ohios’ service life has been extended to 42 years, which is considered the absolute limit to their ability to submerge for deterrent patrols.

The first Columbia is expected to go into service when the first Ohio must retire.

The Navy missile boats are “the work horse of our national deterrence. … To have one of the old ships go off line, and not have a Columbia ready to replace it, obviously would create risk,” Courtney said.