

Nuclear Deterrence Forum: RADM Scott Pappano

Wed, 8/24 1:43PM 48:02

SUMMARY KEYWORDS

industrial base, submarines, columbia, ship, triad, question, class, drive, ohio, strategic, navy, admiral, additive manufacturing, risk, sea, frankly, industry, maintaining, workforce, started

SPEAKERS

Maj Gen (Ret.) Larry Stutzriem, RADM Scott Pappano, Sangmin Lee

M Maj Gen (Ret.) Larry Stutzriem 00:03

Good morning. I'm Larry Stutzriem Director research here at the Mitchell Institute of Aerospace Studies. In this era of great power competition, nuclear deterrence is still the bedrock of our ability to determine adversaries actions, especially those of nuclear competitors. Russia is developing innovative nuclear weapons delivery methods, and China now fully supports a full nuclear triad. Now more than ever, the issue of maintaining, upgrading our own triad should be at the forefront of our minds. I'm sure you're all familiar, but here on our nuclear deterrence forum, we normally like to focus on the ground and air breathing legs of the nuclear triad. The Air Force owns and maintains the Minuteman III ICBM program, as well as our strategic bomber force. But today, we're extremely fortunate to have Rear Admiral Scott Pappano with us to discuss the Navy sea leg of the triad and its importance moving into the future. Admiral Pappano is the Program Executive Officer for strategic submarines in the United States Navy. He's a graduate of the US Naval Academy, and holds a Master of Science in nuclear engineering from MIT. Prior to his current role, he served as the commander of the Naval Undersea Warfare Center, the Director of the Comprehensive Test Facility, and the Program Executive Officer of the Columbia class submarines. Now at sea, Admiral Pappano has served aboard a variety of nuclear powered submarines, including general purpose, ballistic missile, and guided missile subs. Well, Admiral, it's a privilege to have you here today. And I thought I'd start by giving you a few minutes to tell us about what you do and what your priorities are.

R RADM Scott Pappano 01:48

Thanks very much Stutz for having me. And thanks for that introduction. I think it's very important. As you know, again, I'm feeling a little bit like a fish out of water here at the Mitchell Institute of Aerospace Studies as a submariner not a place I would normally venture into. But I think it's important, you know, as we get into the, you know, the generational recapitalization of all of our strategic forces, I think it's important to have that united message that we need all legs of the strategic triad, right. And so, I'm responsible for the procurement and in-service sustainment of the sea based leg of that deterrent. So under that role, just to define, you know, set the stage for what I do is that's maintaining the Ohio class in-service SSBN force making sure we get that shipped end of life, as we bring on the new Columbia class submarines, to

replace the the Ohio that are aging out right now, and really for me to drive that transition from Ohio to Columbia smoothly to make sure an uninterrupted sea based strategic deterrent, is maintained throughout that to meet STRATCOM requirements for the sea base force. That's a challenge right now with you know, the industrial base where it is. So under my purview also is a submarine industrial base element, right to kind of connect those two things to provide the feedstock for both the in-service and the new construction submarines to help support the defense industrial base, so I dabble in that as well. And then the other way I want people to think about on the sea base side is it's not just the submarine that I manage. It's also, you know, very closely requires working with strategic programs, Admiral Wolfe, who provides the strategic weapon system and the missile is part of that. So the modernization of the V5LE to the V5LE2 is part of that modernization package. And, frankly, the strategic shore infrastructure that has been aging over years that we built with the Ohio class at Kings Bay in Bangor, not only, you know, bringing on the things that we need to do for the Columbia capabilities but recapitalizing those existing structures and capability as part of the weapon systems where I have a two crew concept, you know, I need a viable training facility to train a crew ashore, while the other crews at sea with the ship, bring it in and have that crew ready to go to sea immediately as we do and quickly turn around maintenance in our facilities to make sure we have the maximum operational availability of those submarines to meet the requirements of STRATCOM. So, that's kind of the big picture right now. So I'm certainly happy to dive into any questions you have.

M

Maj Gen (Ret.) Larry Stutzriem 04:22

Well, it's a big picture, big span of responsibility. We will get into industrial base in a little bit and some questions here. But I thought I'd started at the basics and ask you, you know, explain the role and importance of the sea leg of the triad in terms of supporting our nuclear deterrence.

R

RADM Scott Pappano 04:40

Okay, great question, obviously. Yeah, as I look across the triad in general, all legs have their strengths, right, whether you know, it's the speed of the ICBMs, it's the overt signaling of the bombers. You know, what I think the sea base leg brings to the table is obviously our stealth and survivability to survive a first strike, you know, without being detected and know where we are to hold us, you know, to deter our peer competitor from doing that. It also carries about 70% of the nuclear deterrent right now for us. And so, I'd say it's the largest and most survivable leg, again, but we need all the different legs of the triad to perform the different parts of the mission.

M

Maj Gen (Ret.) Larry Stutzriem 05:21

Appreciate that. It's interesting, I'm a Cold War-era guy, where I started, and the original, you know, the SLBM force was sized for two fleets, one in the Atlantic, one in the Pacific, but it was about the Soviet Union at that time, and we maintain that posture against Russia later. And then now we're looking at where we see China, you know, the images are out there. They've

committed to huge rebuilding of ICBMs. Of course, I mentioned earlier, its own triad. I'm curious whether you see a change in weighting of where we station our submarines or perhaps the numbers are going to change.

R RADM Scott Pappano 06:03

So right now, as you suggest, there's been a on the naval side, especially, there's been a flow of forces from the Atlantic to Pacific based on the chains in the in the threats that we're seeing in the world today. Without getting into classified details, obviously, our SSBN force is capable of supporting multiple packages from either coast, right. So it is not various flexibility in that in our ability on targeting, to cover both of the or whatever threats are out there right now. I'm not a targeteer and I won't get into any specific targeting things. But there's obviously flexibility there on where I can target with whether, what ocean they're in, is less dependent than it used to be in the past.

M Maj Gen (Ret.) Larry Stutzriem 06:47

Yeah, well, let's talk about Columbia class, you oversaw that acquisition cycle. And what can you tell us about how many and timeline for delivery?

R RADM Scott Pappano 06:58

Yeah, I still do oversee it as part of the portfolio. And so right now, you know, based on the most recent nuclear posture review, Stutz, is that states that we want at least 12 Columbia class submarines to replace the 14 Ohio's that we currently have right now. Right now, the original plan was to go for 14 to 12, on Columbia, Ohio, a correction Ohio to Columbia, was I took out, there's no need to refuel the Columbia based on its design so I could get the same operational build availability by saving a year and my midlife depot period to buy back some of that. Now we're continuing to analyze that right now going forward, it certainly reduces risk if we have a 13th or a 14th SSBN, Columbia class SSBN. And so we continue to evaluate that that's not a decision we need to make right now. That's something we need by the end of the decade, we need to make that decision on but the current class is planned for 12, Columbia class SSBNs.

M Maj Gen (Ret.) Larry Stutzriem 07:53

So beyond the numbers, what can you tell us about how the Columbia class improves over the Ohio class?

R RADM Scott Pappano 08:01

Well, frankly, it's the biggest, it's the quietest and most capable, you know, nuclear submarine our nation will have ever produced. It's really a fantastic machine. Again, I can't talk too many details about that but it is the quietest, it is the biggest, it brings the same stealth and survivability at a more advanced level than the Ohio brings. And also, you know, we've also

continued, like Ohio, to design sustainability into that class, which I think is very important to make sure we get that ship into life and have the sustainability of it. And you can turn that ship around quickly and let the crew obviously stay in that ship throughout its life.

M Maj Gen (Ret.) Larry Stutzriem 08:38

I saw some remarks you gave at the Naval Submarine Leagues get together and you were concerned, seriously, about supply chains, and I'm just curious, do you still have those same concerns? Has that changed at all?

R RADM Scott Pappano 08:54

No, absolutely. That remains, you know, frankly, on the new construction side of the house, as we build submarines and ships and everything else, and sustain them, that remains the biggest risk right now, I would say, across a couple of different fronts. And principally, I'd say my biggest concern is about workforce. That getting the right workforce to go do that, in the skilled trades, both in our nuclear shipyards and throughout the vendor base that provides material that feeds those shipyards. It is a little bit different world than it used to be, right? And we've since the heyday of shipbuilding in the 1980s under the Reagan buildup years, you know, we were about 33% of the industry was, you know, jobs in the United States were in manufacturing and we're somewhere down around 11% as we've shifted from a manufacturing-based economy to a service-based economy. That tied with a real push to send kids to college where you had to be successful, that's not true. We need skilled trades, feeding our industrial base right now. And so that's a very big push for us right now. There's a couple of initiatives that we're working on in coordination with OSD for workforce development initiatives and recruiting and retaining initiatives for throughout the industrial base to go help drive those things across the nation because I think, frankly, not only when we talk about the triad for integrated deterrence, you know, our industrial base is actually part of that integrated deterrence picture, right? That it ought to drive, you know, our ability to deter our peer adversaries, right? If we don't start redeveloping that industrial base, I think that we're, you know, it's going to be detrimental in the long run.

M Maj Gen (Ret.) Larry Stutzriem 10:30

Oh, fantastic points. Well, let's drill down on that a little bit. In terms of industrial base. The ability that shipyards today talk referred to, you know, that change, but is that affecting, staying on schedule? What happens downstream?

R RADM Scott Pappano 10:46

Right now, it's a challenge getting the workforce right now, as well as getting the supply base to get the amount of materials that we need to push in. Because we've seen a significant ramp up in shipbuilding, obviously. And so there's, you know, we were just at our nuclear shipbuilders and electric boat in Groton and Quonset point and Newport News in the Hampton Roads area. We've gone from one per year, Virginia construction to three per year Virginia construction, adding a large center section called the vertical payload module to that Virginia, and now

adding Columbia. So by FY 25/26 timeframe we will have it's about a five fold increase in shipbuilding, from the you know, from about five years ago, which is a significant ramp up right now. And so, the Columbia program is our priority program. And that's our number one acquisition program. And we're driving that with the shipyards right now. And so, right now, the plan is an 84-month contract delivery schedule on that submarine. We have worked with the ship builder to build a 78 month early delivery schedule, we're behind that 78 month schedule right now, we're trying to drive back on a restoration path still at 84 months. But there's risk in that, obviously. And so what my goal is obviously not to actually drive that schedule back to that 78 months, while not or minimizing the effect on the Virginia class construction or any carrier construction down at Newport News, right? Because, frankly, we need all our forces, right? So we really need to drive that workforce build up in the capability of those nuclear shipyards to build those ships.

M

Maj Gen (Ret.) Larry Stutzriem 12:21

You know, the industrial capacity, that's a national security issue. Where is strategy nested? Is industry taking care of this? Does the Navy take possession of it? What's the future outlook of the industrial base for the future?

R

RADM Scott Pappano 12:36

So I think for many years that the Navy did not, right, and so we left that to the to the prime contractors to get what they need. What that has led us to over time is you know, back again back in the heavy shipbuilding days, the shipbuilders could buy very transactional things, if they wanted to go get material, they wanted to get workers, they made the call and it came, right, because there was enough of the manufacturing workforce was still there. They don't have that luxury anymore. So as we started this ramp up in the submarine shipbuilding, we the government, the Navy, started to look what we call the integrated enterprise plan and to at least evaluate where we were in that ramp up and found some some trouble spots, we made some investments with very good support from Congressionals on the Hill, to support those efforts to develop the industrial base and key market sectors continuing to do that, and that was part of the reason why we stood up still being industrial base director under my hat and under the executive office to help drive that. But until recently, we started looking at workforce as well. And it needs to be a whole of government effort, right? It's what we've come around to. So, although we weren't very much involved with that in the past, we are driving that very, very hard right now to try to develop regional training pipelines in our core concentration areas. We are driving some of what's called accelerated training and defense manufacturing pilot down in Danville that we're going to work on with OSD, IBAS (Industrial Base Analysis and Sustainment) to help drive adult learner pipeline where, you know, we push students, adult students through their and in a four month period for welding, machining, metrology, additive manufacturing, things that we think we're going to need in the industrial base, and then work to get those folks placed in the industrial base, whether it's a nuclear shipbuilders, or the tier two through five or 10 suppliers that we need that to build out that workforce. So we're going to continue to advance that that Regional Training Center concept, if you will, starting in the New England area and Hampton Roads area through Danville in Virginia and then look at other key concentration areas where we have a lot of vendors in the industrial base. Think California think, you know, New York think Great Lakes region and when we start bringing those centers, develop these pipelines to drive people into training for the skilled trades and know that they

can have a successful career doing that. That's an incredible insight, you know, that we typically talk about a shortage of engineers or STEM in general. But the trades being so important in maintaining that, that pipeline. That's that is our key limiter, right, that we and we still need engineers. I don't want to say nobody needs to go to college, right, but what I'm trying to say is we need a lot more welders, machinists and pipe fitters and ship fitters and electricians. And, you know, I'm working to get the message out right now that you know hey you could have a great career doing that in the skilled trades, frankly.

M

Maj Gen (Ret.) Larry Stutzriem 15:44

Really interesting. Well, let me let me ask you about an issue with respect to the Pacific. And that is that the United States, UK and Australia are teamed up to build some submarines. Do you think that in this discussion of industrial base, does that chip away at it? Is there a risk to US production?

R

RADM Scott Pappano 16:07

Well, what I'll say is right now, I think, my understanding, I'm not directly involved with that right now, my understanding is that it's a 18 month study that's going on and should be poured out in March 23. So I think as we drive towards March of 23, we'll have to figure that out. Because we are if you're asking my opinion, if we were going to add additional submarine construction to our industrial base, that would be detrimental to us right now, without significant investment to go drive to provide additional capacity and capability. I'm gonna do that. And I think that I won't speak for the UK, but I think that exists for both the US and UK where we're looking right now.

M

Maj Gen (Ret.) Larry Stutzriem 16:42

Sure, sure. Well, beyond supply, side supply chain issues we mentioned earlier, you know, what do you assess is some of the other risks to delivering Columbia class? Probably, these are the things that keep you up maybe at night?

R

RADM Scott Pappano 16:56

Well, I think, really, it is in the shipbuilding enterprise, that's the key thing. But there's a couple of things that we haven't done in, you know, 20 plus years, you know, a full, you know, missile test program, you know, strategic weapons test systems test program, on a new class of ship that we're driving to build a team for that right now. We have done missile testing through strategic programs office, but you know, essentially getting the lead ship of a new class, and the in yard testing, you know, hasn't been done in 20 years. Right. So getting a team together to do that, getting that team ready. We're still a couple years out from that. But those are things that we're working on right now. And frankly, the other thing that, you know, as I talked about a little bit of beginning, it's the strategic shore infrastructure, right. And it's less about delivering the Columbia but it's more about making sure I have my refit facilities and training facilities ready to go to receive that ship. And in the short term, they will be but you know,

making sure I have the right investment and those strategic shore or infrastructure to support that ship as soon as it gets there. And that capability then supports the Columbia class into the 2080s, as we need it to do.

M Maj Gen (Ret.) Larry Stutzriem 18:01

Yeah, well, of course, the Ohio class submarines are getting toward the end of their life. I think they were first fielded in 1981 or so and they're undergoing or they have gone through a service life extension program. Or we're thinking about that, I think, yeah?

R RADM Scott Pappano 18:22

Yes. Yeah. So if you want, I'm happy to talk about that. Yeah.

M Maj Gen (Ret.) Larry Stutzriem 18:26

Well, I'm just curious if in this transition, you know, from Ohio to Columbia, is the risk there?

R RADM Scott Pappano 18:32

Certainly that that's really, that's my job is to manage that risk. It's like to get the Ohio to the end of life, as we bring on Columbia is in a heel to toe possession. And that's really the definition of my job. And frankly, as you suggested, you know, with the Ohio, it was a ship that we had designed for it to be a 30 year ship. Very well designed, well built ship so we got to the point where we were approaching 30 years. And, you know, back in the early 2000s, did extensive study service life extension study on those. And we were found that we were able to extend the Ohio class from 30 to 42 years as a class. So that allowed us to defer some of the recapitalization of the sea based strategic deterrent to where we got to be in Columbia, you know, where we are today with the Columbia class. But right now, we have not operated submarines out to 42 years, we've come close with some fast attack submarines that we've had out of the 40 year range, but it's kind of uncharted territory. And so there are certainly risks with that. So we're watching that very closely. And as we get closer to that, you know, part of this transition as I talked about being heel to toe, from Ohio to Columbia, as one comes off, one comes on, I think that you know, you know, to meet my requirements to STRATCOM, which is having 10 submarines ready to proceed at the unclassified level. There are going to be times when I intend to make 10 in the 2030s and I think it'd be a great idea to have a couple other holes around both, you know, to buydown risk for the unknown unknowns, support additional V5LE2 missile testing. So we are looking right now, in fact planning to do individual service life extensions for up to five of the Ohio class SSBNs through what we call pre inactivation, restricted availabilities where we spend about 18 months in the depot to buy about three years on the back end and extend some of those Ohio class submarines to have a couple around, as we bring on the Columbia class to make sure we have a list. And then obviously, we're doing everything we can to bring Columbia class to the left earlier long lead time material procurement earlier, you know, advance construction, those kinds of things to try to continue to bring the class back to the left to mitigate, minimize any gaps, eliminate any gaps and get as much overlap as we can. Well, I would say 42 years as a youngster compared

to some of the Air Force bombers... Well, how about service life extension? It is an interesting discussion, too, as you know, the, that was a debate on the Minuteman III, you know, it doesn't steal money from the Minuteman III replacement GBSD? Or, you know, where do we put the limited resources when taking those costs into consideration? What do you think about further SLEP-ing of Ohio class? I think, you know, as the as the guy driving at sea base strategic term platform angle of this, I think it's, I think it's the right thing to do. Right. And frankly, I think you've you know, you've probably heard Admiral Richard say this in the past, but we have to stop talking about if this is the most important thing that we're doing is strategic deterrence. And that underpins, you know, our national defense right across all legs, I think we have to stop talking about what we can do with what we have, and what we need to do what we need to do, frankly, right. I think that, again, it's easy for me to say that because you know, but I think that there needs to be that discussion and drive for those kinds of things to make sure I have that availability. The right, you know, strategic deterrence for the nation.

M

Maj Gen (Ret.) Larry Stutzriem 22:05

Yeah. And SLEP-ing is going to help with that transition and reduce that risk you have between different classes. Absolutely. Other risks to that transition?

R

RADM Scott Pappano 22:16

Oh, I'm sure there's plenty out there that you know, but that's probably about all right now, I think, you know, I say, look, again, we talked the Ohio's getting to end-of-life life. We talked about Columbia's coming left, we talked about strategic shore infrastructure, we talked about industrial base. That's pretty much the things that keep me up right now. So I think we're good.

M

Maj Gen (Ret.) Larry Stutzriem 22:32

And you talked very well about how to mitigate some of those risks. Appreciate that. Well, it's the Columbia class, your number one priority in the Navy, and it's in your portfolio. What do you think about resource commitments to this? What's the temperature of Congress in terms of...?

R

RADM Scott Pappano 22:51

I will tell you, we've been very Congress has been very supportive of the class, right, I think that, you know, my read, you know, when we go to the Hill, and all the readback I got is, they understand the importance of the sea base leg of deterrent, and all legs of the triad, they had been very supportive of the Columbia construction. And in fact, even things were initiatives we did to try to bite out risk and bring Columbia construction to the left, which caused you know, rephasing of money earlier than it might otherwise be required. They have been supportive of that as well, to try the drive that earlier, purchase of long lead time material, that earlier advanced construction, to continue to do everything we can to bring Columbia class deliveries to the left and very supportive of that.

M

Maj Gen (Ret.) Larry Stutzriem 23:37

Yeah. You know, earlier I mentioned we did this survey, public knowledge of the support to the triad, and you know, you tell them about what's going on. And it's, it's amazing how much support there is for where might there be some budget, tightness in this program, the Columbia program?

R

RADM Scott Pappano 24:00

As far as where the budget risks are? Again, I think that you know, again, we it's my job to make sure I'm defending exactly and my program is defending exactly why we're doing and not you know, be running amok obviously, with you know...We are challenged at all our request for funds right now, but we are essentially in our buy for this, we are building the first ship about 25% complete, we have advanced construction on the second ship. And so a lot of the earlier battles were about when to go initialize those and the only other thing we have outstanding right now, is how I have 10 ships left to buy. It is more advantageous to us and the industrial base to pull those into, you know, group those in as big of contracts as we can so our plan is going to be to get five of the next five ships and the next contract which will you know, the plan is be the start the third ship in the class in FY 26. So, we're starting to work that right now as far as you know, the budgeting associated with that. I'd love to do all 10 but you know, that's just kind of a bridge too far right now. But we'll look at material buys for those because the other thing I want to do is, you know, as far as risks in the industrial base, as much as I can level, load them, get a demand signal for the industrial base, you know, to get at least five ships, that's perhaps up to 10 ships, the material getting ordered and the industrial base to try to have make sure that demand signal is out there. That's something we're looking at right now as well, too, as we move forward here to try to buy down any industrial base risk there.

M

Maj Gen (Ret.) Larry Stutzriem 25:30

Yeah. Well, I really appreciate it and I know our Dean, Lieutenant General Dave Deptula really appreciates you coming on this program. It's important, as we discussed earlier, that we talk about the triad and its entirety. And we look forward to having you back sometime. We're going to transition to Q&A right now from the audience. And what I'd ask is, when I call on you for questions, please unmute your mic and identify who you're with. And, and we'll start with question from Michael Mattis? Oh, no, I'm sorry. Sangmin Lee. Go ahead and ask a question.

S

Sangmin Lee 26:26

Can you hear me?

M

Maj Gen (Ret.) Larry Stutzriem 26:27

Yes, we can.

S

Sangmin Lee 26:29

Okay. I have a question about North Korea. North Korea into the port to develop new submarine in order to launch SLBM. Can you share any update of indication on this? And then second question is that is the US ready to deploy US nuclear submarine nearby Korean peninsula if North Korea will conduct a nuclear test? Last question, what do you think about what they think of it the argument that South Korea need to develop nuclear submarine to respond to its current nuclear test?

R

RADM Scott Pappano 27:04

Okay, great question. I bet my answer is probably not going to fully satisfy you. So the bottom line is, you know, because we're in an unclass environment, I can't talk about exactly where we deploy our submarines to, and about our, you know, response to other countries out there. So that's frankly, outside my wheelhouse. My job is to build, sustain, you know, our strategic submarine force, I really can't answer those questions. And as far as the South Korea side goes, I think that's a question for South Korean government about whether they need nuclear or conventional submarines. So thanks for the question. Probably not a great answer for you. But that's about all I can do on this net.

M

Maj Gen (Ret.) Larry Stutzriem 27:43

I thought that was a great answer. We have a question from Kevin Stubbs, Admiral, can you discuss how hypersonics might affect the triad as you look forward?

R

RADM Scott Pappano 27:52

Again, a little outside my wheelhouse, but obviously there are hypersonics being developed on the Navy side and kind of jointly with through the strategic programs under Admiral Wolfe. You know, I, I don't know the answer about whether, you know, conventional nuclear, again, that's outside my wheelhouse. But my understanding of the plan is that we would not deploy the hypersonics on our strategic submarines. There'll be other platforms that we will be planning to deploy those weapons from rather than our Strategic Forces.

M

Maj Gen (Ret.) Larry Stutzriem 28:24

Can you talk to another question from the audience here, talk to potential replacement of the V5 and future of the Columbia class?

R

RADM Scott Pappano 28:32

Oh, absolutely. I can do that a little bit. Again, the missile development from V5 to the V5LE2 is under Admiral Wolfe and strategic programs right, he owns a strategic weapons system, which I host on the submarine. So we work very closely. And not only with Admiral Wolfe, but also with our UK counterparts on the Dreadnought program, which is their counterpart to the Columbia class. So moving forward, you know, in parallel with Columbia, the Columbia class development is a transition from V5 to V5LE2 that transition will take place. You know, by Columbia home

nine and beyond, will have all the five LE2 missiles on it. So in the earlier Hall classes, we'll have to find opportunities, working closely with Admiral Wolfe and his team to make sure we have SSBNs available for test flights on those missiles. So we have to test them on both Ohio and Columbia class submarines because we're in the transition there but beyond Columbia Hall nine builds, those will be the V5LE2 missiles and going forward from there.

M Maj Gen (Ret.) Larry Stutzriem 29:36

Very good. Admiral, I've got a really interesting question coming in from a young kid, Michael, and he says he wants to be a naval aviator, but he does want to know how they name the ships. Do they name submarines?

R RADM Scott Pappano 29:50

So how they name them? Yes. Okay. So Michael, great question. Right. But the bottom line is that it is a Secretary of the Navy decision, right, so we have some naval instructions on how we name the ships. Um, you know, if I could help talk you in the submarining instead of aviation, let me know. Okay, I'll get my number out here after this. But the the naming conventions typically the naming is completely by the Secretary of the Navy. That's his discretion on how he does that. Right now, if you look at our ships that are classified, our strategic submarines, they are typically named after states. We've started taking up state names on the Virginia class submarines, we've stopped that they're going back to World War Two tradition of naming after fishes. Have you seen the last couple of Virginia class submarines that have been named, but we will maintain the state names, the first set of classes District of Columbia, which is, I would say, a state or a district at this point. And so everything else will be second ship to the classes the Wisconsin and then the follow up ships have not been named yet.

M Maj Gen (Ret.) Larry Stutzriem 30:47

Okay, Michael, the admiral will be sending and recruiter to your house. Question here about additive manufacturing in the industrial base in shipbuilding. Is that something that's a priority? Are we moving toward that?

R RADM Scott Pappano 31:02

That is a fantastic question, right, because I will tell you, Stutz. You know, as we talked about risk in the industrial base, I talk about constrained market sectors, some of our most constrained sectors are in castings and forgings, right, where I pour molten metal into sand, and then machine it, right. And so, for big equipment, we have struggled there and that market sector and additive manufacturing, I think, is a key to breaking through that and going forward here right now. And there's been some inertia resistance to doing that in the Navy. My team is working to drive through that we have some very strong initiatives in that area right now. I mentioned Danville a little bit earlier, in addition to the additive training and defense manufacturing, we are standing up the Additive Manufacturing Center of Excellence in that area right now, where we're gonna drive to buy a couple of working with a consortium of folks right now to bring in across industry, across academia, across national labs, and, you know, our

industrial base partners to bring in, hey, what machines can we do this on for a directed energy deposits or different types of methods for additive manufacturing. And we're going to qualify processes down, we're going to drive through that. And we're going to allow that rather than trying to qualify individual capabilities, we're going to qualify machines and processes, so that we can farm out that capability, the industrial base, and lower the barriers of entry to making parts for across all submarine ship aircraft classes. Right now, frankly, the aircraft industry is ahead of us in this they use a lot of titanium additive manufacturing parts right now, we have some different materials that we have to drive into like high yield steels, different copper that we're working on right now in the Navy, and we are going to drive this forward and push it. We have to. I think it's an imperative to go do that. And by doing that, then if I lower those barriers of entry, where you can buy a CNC machine, and qualify in a process, now you can have we can push towards a more distributed industrial operations, if you will, right. Where, hey, a smaller startup company could have a couple of machines and just be making parts for, for the Navy, for the Air Force, for the Army. I don't care who it is, but we'll make it for the Navy. First, we'll put those at the top of the list. That's fantastic. We've done some additive manufacturing papers and studies here at Mitchell. And what a technology, what a growth in that. It's great to hear. Hey, we have a question here that asks about GAO saying that there's some growth, cost growth for the Columbia class. And he's just asking, what are some of the factors in that cost growth? So frankly, right now there, we are well, within our OSD cost caps right now. So it's actually a cost cap. It's actually a cost goal for us right now. And we've actually in the latest round that, you know, it's lagging, the GAO reports a little bit right now. But we've actually seen some reductions in costs in Colombia class based on kind of how we're how we're prioritizing work right now. Now, there's obviously risk, right, if we're talking about the current environment that we're in right now, if we're seeing, you know, inflation of prices of commodities, and, you know, trying to recruit a workforce that we might have to pay more, you know, there's possibly those are risks for growth going forward here. So I won't, you know, I think everybody understand, you know, coming out of the pandemic, and whether, you know, that kind of had some issues, you know, and reprioritize, what people were doing, and where we are going forward right now, we certainly, if you go to the grocery store, and food costs more, you could probably expect that nickel and copper cost more as well, too. So things will continue to evaluate, but there is risk there, certainly.

M

Maj Gen (Ret.) Larry Stutzriem 34:41

Yeah. Well, Dan Rice, has a question here, he wants to ask a more broad question about nuclear deterrence. And he mentions that you mentioned that, you know, numbers of subs may be going down, but we also look at an aging bomber force, potential delays to Minuteman III...maybe not. What is , as you're out there on the public circuit, what are you telling the nation about the importance of maintaining adequate capacity, in addition to modernization?

R

RADM Scott Pappano 35:16

Are we talking...I guess...So, if you're talking just about the sea base deterrent, okay, that's easy for me to talk about, as far as...I generally don't talk about the broader, you know, I don't have the details on the missile or bomber, you know, modernizations or delays or everything like, so my general message has been, obviously, hey, we need to we need all legs of the deterrent, all legs of the triad here to accomplish the mission. For the reasons we talked about the very front, every piece of that triad has a particular mission that it is important for it to do.

And we generally speaking will talk, you know, we try to make sure we educate inside the beltway here, a lot of times we have new staffers coming on, we have new folks coming into key leadership positions on the Navy staff, we will run a seminar for those folks that talks really about all the levels of the triad, all legs of the triad. We will focus primarily on a sea base leg because that's our job. But we want everybody to understand what those other factors are, what the other legs of the triad do, to support overall integrated strategic deterrence, right. So education is usually best here and talking in these kinds of forums to cross pollinate about what the sea base leg brings, you know, and having the bomber and ICBM folks talk, you know, at our forums, you know, to go look at those, you know, how we talk about their importance, you know, and how we fit the whole picture together.

M

Maj Gen (Ret.) Larry Stutzriem 36:39

Yeah, very good. Question here about NC3, the command and control. Is it as important to the, to the submarine fleet as it is to the rest of the triad?

R

RADM Scott Pappano 36:51

Yes, it is. It's outside by, again, outside my wheelhouse. But absolutely, modernization of NC3 is critical for us, right. Because we, none of us can deploy nuclear weapons without effective NC3, that's the backbone of all of this.

M

Maj Gen (Ret.) Larry Stutzriem 37:06

There's a number of questions here that I'll just summarize that talk about your thoughts about how, whether, the services can collaborate to communicate to the nation more effectively the need for a modern and adequate triad?

R

RADM Scott Pappano 37:25

I think, absolutely. And I think we've started to come together in a couple of different circuits, you know, where there were has traditionally been either submarine-only, or, you know, you know, ICBM bomber-only those kind of things. I've seen a lot more common events right now, where we were bringing all legs of the triad together, kind of to talk about specific things, and I've sat in on panels recently with, you know, Air Force generals, you know, responsible for that, for those legs. And, you know, having a joint panel on those kinds of things, I think, is absolutely necessary. And it's a...I think it's obviously getting the message out to the public, which is also imperative, right. I think that there's an out of sense, you know, for a long, long time, I think it has not been on the forefront of the public's mind. But now that we have a nuclear power, you know, in a conventional, you know, war with a neighbor, I think that has brought that to the forefront again. And so reminding the American public how important it is to have strategic nuclear deterrence is important. And I think the easiest way to sell that message is to ask ourselves, whether we're deterred or not by Russia's nuclear arsenal right now. Would we be doing more in Ukraine if Russia was not a nuclear power? I'm not a policy guy. But I think I would answer I think the answer is, "yes." So it's an opportunity to talk about nuclear deterrence and what it does as a stabilizing force.

M

Maj Gen (Ret.) Larry Stutzriem 38:53

This is an interesting question, little bit of a stretch, or would you say, Columbia class development is well integrated with the larger naval force to ensure better integration and interoperability once the first sub fields, about with the joint force?

R

RADM Scott Pappano 39:10

It's kind of a loaded question, right? Because I am an independent operator, right as an SSBN. So it is designed to integrate so where I plug into the joint force is through NC3, right. That's it. In general, we are, our submarines are designed to integrate with the joint force, but mostly on the fastest acquisition side of the house, where I can work across the, you know, the joint force to communicate and you know, deploy, you know, weapons and those kinds of things. The SSBN's job is to operate independently, unknown to the joint force essentially, right, yes, undetected by the joint force. So we don't even allow ourselves to be detected by our own forces.

M

Maj Gen (Ret.) Larry Stutzriem 39:51

That's very good. Good question here given the massive amounts of software required to maintain all the systems aboard a sub and the rapid innovations in AI, cyberthreats, autonomous undersea vehicles, and so forth. Is there a plan to keep up with advanced threats and accelerate innovation cycles to keep Columbia ahead of the curve?

R

RADM Scott Pappano 40:15

The answer, the short answer is yes. Right. And so the way we're doing that is, you know, back, when we bought the Ohio, we built milspec, essentially, combat systems that, you know, were lasted for, you know, 10-20 years and then got replaced with a new milspec system. What we have done is, you know, what we did on the fast attack, submarine side and our non-propulsion electronic systems, think about all the things that have software, combat systems, sensors, weapons, those kinds of things, where you think about software driven, where you're analyzing data, they can bring AI ML to bear, we are doing all that right now to try to keep up with the pace of industry essentially, right and processing power that will be brought to bear. So we started that in our fast tech submarines, where we, we bought our dyes, hardware, and software on different cycles. And we'll continue to modify that to drive to a virtual environment on the fast attacks. And I'm talking about those because what we are doing is, the SSBNs will follow that we used to have separate milspec systems for the SSBNs. So we're driving the innovation into the fast attack submarines, to be able to do that to get to the point where we're in a, you know, a virtual environment, it's, you know, it's hardware agnostic, if you will, and then I can upgrade software on a faster base, and upgrade hardware when I need to, but separate from software. And so we're driving to that in the FY 24/25 timeframe for kind of initial fielding of that virtual environment, there's some of that already going on in pockets. And then whatever we do in the fast attacks, we will bring that right into the SSBNs. So there's commonality between our classes, that's better for crew training, it's, you know, so I can bring a fast attack sailor to an SSBN, you know, without any, you know, you know, spin up time,

essentially, to go get to that new level. And then I can modernize the same ships with the same software, you know, much closer together, the less diversity I have of those systems, the better off I am sustaining them.

M

Maj Gen (Ret.) Larry Stutzriem 42:13

A question about from industry, anonymous, but can you name your top several wish lists? In terms of I think the question means, what you'd like industry to be doing better for you?

R

RADM Scott Pappano 42:31

Yeah, I think if that's the question, I think the answer is, I need your help. Right, I need...First of all, you know, for what you're doing right now, if you know, in the industry, I need, the best thing is first time quality, meet schedule, meet costs, right? Develop your own individual processes to go through that first time quality on schedule at cost, right. That's the best thing you do. Where we're looking to expand, right, I'm looking for your help and where those things are, my job is to give steady demand signal to the industrial base. And so they have, they can make investments based on that. I'm trying to do that by saying, hey, the next contract for Columbia will be five ships, you know, and then we're going to look to buy 10 shipsets to try to provide that stability and investment opportunity. But the other thing is, hey, work workforce, workforce, workforce. Work with your local, I think we broke down a lot with, you know, developing the workforce that you need, right? I will help where I can but we're industry can help themselves is rebuild some of the connective tissue that maybe broke down in the 90s and 2000s as we as we dropped the manufacturing base. With the continuing technique to CTE schools, you know, the kind of the high school-level trade pipelines, if you will. Rebuild those ties. We've done some of that at the Philadelphia pipeline project. And I think it's an opportunity to kind of work with local communities, local schools, local government officials to go work to get those pipelines. The more of the independent pipeline development and workforce development that we do to try to rebuild the nation and manufacturing, I think is the best that we can do. Individual companies, quality, you know, cost schedule, keep driving those things, let me know I can help. But nationally, we need to kind of drive that workforce back to the skilled trades, the engineers, everything that we need to rebuild the manufacturing of the nation.

M

Maj Gen (Ret.) Larry Stutzriem 44:22

Yeah, there's part two to this question that has to do with communicating as a PEO. Do you think communications between industry and your needs is adequate?

R

RADM Scott Pappano 44:34

I think it can always be better, right. And so, I think that there has been traditionally, I think there's been some communications gaps, as I talked about, between the prime contractor and some vendors, right, where that used to be very much a transactionally driven process. I think that there needs to be better communication there. And I think the prime contractors are working towards doing that right now. Forums like these, forums like maybe sub-league NDIA

events, is a chance for me to communicate. And so and now we are starting to do much more of that across all spectrum, right and but the best way that I could communicate is have a no kidding demand signal. Hey, two ships under contract that now five ships coming under contract then you know we're buying five ships' material. The more we could do that and how that's tied to Virginia class shipbuilding or nuclear aircraft carrier shipbuilding, so that we have that demand that we know is going to need the industrial base. That's the best way I think I could communicate. But because talk is cheap, right, I can go to those forums and say I'm gonna buy 12 submarines, when I have those submarines under contract is when industry believes me, frankly. Right, to.

M

Maj Gen (Ret.) Larry Stutzriem 45:39

Let me pull you back to Ohio class subs. I love Ohio class subs. I'm sure you do. What are some issues of maintenance and sustainment of those subs that give you concerns about keeping them in the water longer? This is tied to another question, which is just generally about any concerns about maintenance and sustainment of that class?

R

RADM Scott Pappano 46:01

So yeah, it's a great question, right. And so you never know, until it get here, right. So I think, you know, we, again, we've done a very detailed study, you know, to get those to 42 years, the Ohio class. But now that we're approaching that, right now, it's in the eaches of those things you have to look at, and every ship is a little bit different. So I will tell you that first risk mitigator, that helps me think about these things is we converted the first four ships to that class guided missile submarines, SSGNs. And so they are an Ohio class whole frame. And we and we have run those ships very, very hard, much harder operating profile, much harder operating environment, than the SSBN platform. But where they go, what they do. And so that's kind of a, the term I've used is "a canary in the coal mine" for us for things to look for. So we're calling data back, you know, looking at the SSGNs right now and learning from them to get the Ohio class, right. And a lot of times, it's kind of, you know, I don't worry about the whole, we'll figure out the whole, right, it's just metal, I can weld metal, it's in the eaches, right, you know, what systems have degraded over time, whether it's, you know, think about, you know, a plumbing system that sea connected system, and what's the erosion/corrosion on that? And how much of that piping system are we cutting out as we do these material condition assessments on these ships to get them to end of life. But we have a good picture, sight picture, on the SSGNs, we will probably, when we start to bring in SSGNs offline, which will be ahead of SSDNs. We'll start doing some destructive analysis of those ships that make sure we fully inform our ability to sustain the Ohio's to the end of life. That's the bottom line.

M

Maj Gen (Ret.) Larry Stutzriem 47:38

Very good. Well, ladies and gentlemen, we've come to the end of this nuclear deterrence forum. And I want to thank you Admiral, it was a great discussion, and I hope we get you back.

R

RADM Scott Pappano 47:48

I'm happy to do it. Thanks for having me. really great time

I'm happy to do it. Thanks for having me, really great time.



Maj Gen (Ret.) Larry Stutzriem 47:51

I want to say thanks to our guest today. And from all of us at Mitchell Institute for Aerospace Studies have a great air and space power day today.