THE SUBMARINE REVIEW

MARCH 2018

35th ANNUAL SYMPOSIUM

1-2 November 2017

COLUMBIA CLASS SSBN
BUILDING THE FUTURE – TODAY

The World Demands Deterrence…The Times Demand Affordability

General Dynamics Electric Boat has demonstrated a new method of constructing the next-generation SSBN that will save millions of dollars per ship, a decade before work begins. Program has achieved Acquisition Milestone B and is proceeding with Engineering & Manufacturing Development Phase. One Navy admiral called it 'The most successful prototype program I have ever been involved with.' It's part of the Navy-EB commitment to controlling costs of a program vital to national security.

GENERAL DYNAMICS
Electric Boat
www.gdeb.com

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FROM THE PRESIDENT

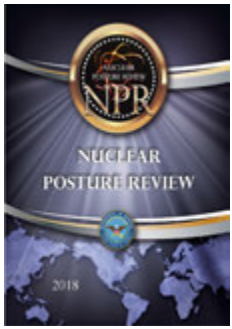
This issue contains much of the content presented during the Submarine League Annual Symposium last November. I hope you find the material informative and interesting as I did. My main takeaway from the Annual Symposium is that the submarine force is extraordinarily well led and has a very bright future. There are sure to be challenges ahead but the leadership of the force has a plan and the submarine force enjoys strong support at all levels in the Department of Defense and Congress.

Subsequent to our last issue of *The Submarine Review*, there have been three strategy documents published that will ultimately have impact on the U.S. submarine force. *The National Security Strategy* (NSS) was released by the White House in December (search for NSS at https://www.whitehouse.gov). The NSS speaks to the growing competition and rivalry in the political, economic, military and information arenas. It lays out four national security interests or "pillars" of national security:

- Protect the American people, homeland, and way of life
- Promote American prosperity
- Preserve peace through strength
- Advance American influence

The third pillar calls for a strong military with both the capability and capacity to overmatch any competitor. It also calls for modernizing our nuclear forces and associated infrastructure.

The National Defense Strategy (NDS) was signed out in January by Secretary of Defense Mattis. The NDS is a classified document but an 11-page unclassified summary can be found at https://www.defense.gov (search for 2018 National



Defense Strategy Summary). The NDS states that competition with China and Russia is the central challenge while at the same time our military must deter and counter North Korea, Iran and terrorists. It also calls for modernization of the nuclear triad.

Finally, *the Nuclear Posture Review* (NPR) reconfirms the long-recognized value of the U.S. nuclear triad and provides direction to continue the comprehensive nuclear recapitalization. (Search for NPR at https://www.defense.gov). The NPR calls for two new types of weapons to be fielded on submarines including a low-yield warhead for submarine-launched ballistic missiles and a nuclear-capable, submarine-launched cruise missile.

A new National Military Strategy is expected to be released in the near future and eventually the Maritime Strategy will be updated to account for the changing threat environment and to align with the strategy documents above. I point out these documents because they form the basis for the enduring need for submarines to our nation's defense.

John Jay Donnelly
President
President@navalsubleague.org

EDITOR'S NOTES

Each year, following the Annual Symposium, the Submarine League has been publishing transcripts from briefings, presentations and speeches delivered at the Symposium. From the standpoint of the Board, the purpose is to help the leadership of our great Submarine Force get their messages out clearly and accurately throughout the community. Many of us were there in the audience a couple of months ago, for us, having a chance to sit down and read the presentation and look at the graphics, may just help clarify some of the points that we may have missed in November. And, of course, for those who were not able to attend, you now have the opportunity to get the Force leadership message just as it was delivered. This issue contains nearly all of the briefings and speeches from our 35th Annual Symposium, and it was a wonderful event. We are reserving one of the individual briefings, CAPT Brian Davies, PERS-42, and the two panel transcripts, the Program Managers Panel and the Junior Officers Panel, for the next issue.

As members of our League understand, it is events such as this Symposium that help to bring all segments of our community together, as well as to provide opportunities to share with the Congressional members who support our Military and our Submarine Force. This year was no exception as both Senator Jack Reed (D) of Rhode Island and Congressman Joe Courtney (D) of Connecticut joined us to listen to our thoughts and to give us their perspectives along with telling us how they have both been supporting our Force.

We are very fortunate that the Nuclear Navy has had such outstanding leadership over the past 68 years. Our current SEA 08, ADM Frank Caldwell, gave us the benefit of his perspective as well as a good lesson in family values relating his experience growing up at the foot of another great submariner, his father. I think that we all enjoyed his account of the "road test" of his repairs to the family car and the theme of ownership and responsibility. The theme of our symposium was "Getting Faster", and ADM Caldwell spoke of his submarine command, the USS *Jacksonville* (SSN-699) as a great example of the need to continue to build

rapid technology changes, and the pragmatic facts-of-life that are built into our ships' hulls, propulsion equipment, etc. We need to be upgrading our ships and the time to be "Getting Faster" is now. He referred to ADM Frank Bowman's list of "gets", to which he has added one of his own, "get off-board". He told us of his belief that we need to focus on how and what off-board capabilities we need to add to our platforms to continue to prepare our forces for every adversary.

It wouldn't be practical to attempt to summarize the remarks of each of our speakers, and I don't believe that I could do them justice. So, I ask you to take the time to look through this volume, and perhaps pick out one or two of the articles at a time and read them through carefully to get the benefit of the thought and experience that each of our leaders have put into these presentations. I know that you will not be disappointed.

Our next volume will be back to a more "standard" format, with book reviews, essays, and other articles of critical interest to those of us supporting the submarine community.

Enjoy, please keep your thoughts and experiences coming so that we can continue to share them.

Good Hunting!
Mike Hewitt
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THE SUBMARINE REVIEW IS A PUBLICATION OF THE NAVAL SUBMARINE LEAGUE

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NAVAL SUBMARINE LEAGUE

35th ANNUAL SYMPOSIUM and INDUSTRY UPDATE

Theme: U. S. Submarine Force – Getting Faster

Wednesday 1 November 2017

0930 – 1100	Board of Directors Meeting	Potomac Room I
1115 – 1215	Luncheon for Board & Legacy Society Members	Potomac Room II
1030 - 2130	**EXHIBIT HALL OPEN**	
1230 – 1730	**BUSINESS SESSION**	
1230 – 1300	Welcome & NSL Annual Meeting **- President**, Naval Submarine League	
1300 – 1345	Update to Members and Industry - **ADM Frank Caldwell, USN,** Director, Naval Reactors	
1345 - 1430	Sub Force Vision/Professional Update - **VADM Joseph Tofalo, USN,** Commander, Submarine Forces	
1430 – 1515	**Networking & Technical Exchange**	
1515 – 1600	NAVSEA Perspective on Undersea Developments, **RDML Lorin Selby, USN,** Chief Engineer and Deputy Commander for Ship Design, Integration and Naval Engineering	
1600 – 1645	**Program Managers Panel** – Technical Update and Overview with Q&A	
1645 – 1830	**Networking & Technical Exchange**	
1730 – 1830	President's Reception for Awardees *(By Invitation Only)*	
1830 – 2130	**Networking Reception**	

Thursday 2 November 2017

0700 - 1900	**EXHIBIT HALL OPEN**
0700 – 0750	**Continental Breakfast**
0700 – 0750	President's Breakfast with Sponsors *(By Invitation Only)*
0755 – 1100	**BUSINESS SESSION**
0755 – 0800	Remarks by **President**, Naval Submarine League
0800 – 0845	Strategic Systems Technical Update - **VADM Terry Benedict, USN,** Director for Strategic Systems Programs
0845 – 0915	Submarine Financial/Programmatic Insights – **Mr. Brian Howes,** Director, Undersea Warfare (N97)
0915 – 1000	Submarine Operational Insights - **RADM Daryl Caudle, USN,** Commander, Submarine Force, U. S. Pacific Fleet
1000 – 1015	Break
1015 – 1100	Acquisition Program Insights **- VADM David Johnson, USN,** Principal Military Deputy, ASN RDA **(Invited)**
1115 – 1230	**AWARDS LUNCHEON** **Remarks by VADM Robert Burke, USN,** Chief of Naval Personnel **(Invited)** **Presentations to COMSUBLANT/COMSUBPAC Awardees**
1245 – 1800	**BUSINESS SESSION**
1245 - 1315	**Fleet Awardees Panel -** President's Q&A with Awardees
1315 – 1345	**Junior Officers Panel**
1345 – 1430	**FORCM(SS) John Perryman, USN**, FORCE, Atlantic Submarine Fleet **FORCM (SS) Paul Davenport, USN**, FORCE, Pacific Submarine Fleet
1430 – 1445	Break
1445 – 1530	Sub Force Acquisition and Technical Update - **RADM Michael Jabaley, USN,** PEO Submarines
1530 – 1645	Update on Submarine Personnel **- CAPT Brian Davies, USN,** PERS-42
1645 – 1800	**Networking & Technical Exchange**
	BANQUET
1800 – 1900	**Banquet Reception**
1900 – 2200	**Banquet Speaker: U.S. Senator Jack Reed (RI)** Recognition of Distinguished Civilian: Mr. Dan Tyler and Distinguished Submariners: ADM Powell Carter, USN, Ret., VADM Dan Cooper, USN, Ret., and VADM Ron Thunman, USN, Ret.

NAVAL SUBMARINE LEAGUE
35TH ANNUAL SYMPOSIUM

UNITED STATES SUBMARINE FORCE: GETTING FASTER

ADMIRAL FRANK CALDWELL, USN
DIRECTOR NAVAL REACTORS

Admiral Padgett, congratulations and thank you, sir, for your leadership. Thank you also for sorting out the slide issues. Jay, I trust that there will be a suitable critique at the end of this.

You know you're at a submarine conference when you notice that all the men in the men's room, when they're done using the sink, they take the time to wipe off the counter. I mean, that's an ingrained cultural item and it's hard to get away from. But anyway, it is great to be here.

Thank you, Jay, for the introduction. Thank you to the Navy Submarine League for all that you do for us, not only for this event but for all that you do to strengthen our submarine family, to communicate and advocate for the submarine force, and to recognize our submariners for all of their accomplishments. Congratulations to this year's award winners.

A special congratulations to Mr. Dan Tyler, Vice Admiral Ron Thunman, and Vice Admiral Dan Cooper. I'd like to say, gentlemen, thank you for your lifetime of service and contributions to the U.S. Navy and the nation. Our force today is stronger because of your sacrifices and your commitments to the nation. I'd also like to publicly recognize Admiral Carter's lifetime of service to the nation as well. And last but not least, I'd like to thank and recognize our industry leaders for your partnership in delivering and sustaining a strong submarine force that is so vital to our national security

Every time I come to this conference I'm reminded of my dad and the submarine family that I grew up in. My dad was all in on submarines, and so were we in our house. I'll give you some examples.

In our house, we did not turn down the volume on the TV, we turned down the volume by 3DB. I can't tell you how many times I've heard my dad say that. My brothers and I learned to hate the recurring semi-annual force revision to the planned maintenance schedule for our home. This

was always conducted late in the evening and always involved a lot of what we would call quality time with dad.

Whenever we worked on a car there was a full-fledged underway testing that occurred. It was usually full ahead and with hard braking, and then full astern with hard braking as well. These were frequently conducted on a dark highway late at night after some long shift work in the garage.

Interestingly enough, though, there was always a discussion about ownership. It kind of went like this, he said before your family drives on it, you make sure you test and make sure it works right. There was a lesson in there. Little did I know that I would learn that lesson and have that responsibility on the submarine force.

We also had in our family the installation of TV aerials. A lot of you younger folks don't know what those are, but TV aerial installation was a major evolution and a core competency in the Caldwell family. This usually required a pre-check of all the equipment, which included this rotor that turned the upper assembly, pre-stage tools on the roof, multiple stays that allowed us to get an extremely high look, even though we lived on top of a hill, and the assistance of two or three nuclear-trained officers who were unfortunate to live near us. They all attended the pre-brief, they all had assignments, and then before we went aloft everybody reviewed what they were going to do. I have to say we probably did not meet the rules for working aloft.

But anyway, the best part of this conference and being in the submarine family is the comaraderie. No matter where you go, no matter what port, no matter what station, that comaraderie comes right at you and there's always a friend. So I think the most valuable part of this symposium is the chance to meet old friends, to reacquaint, and to gain new friends.

Since I have the honor of speaking first, I'm going to give you a short update on what's going on in the Naval Reactors Program. I'll just touch on the things that have happened since we last met, and then I'll talk about our theme, which you can see at the top of the poster here "Getting Faster."

We've been incredibly busy over the last year. There's a lot on our plate. The Columbia, formerly known as the Ohio Replacement, remains

the number one investment priority for the U.S. Navy, and will provide deterrence out to the year 2080, carrying over 70 percent of the operational warheads, and be the most survivable leg of our nuclear triad.

We're on a very aggressive design and construction schedule with no margin. We can't shift the schedule any further right. In Naval Reactors, we're focused on completing the system arrangements and the component designs that will allow us to procure the reactor plant heavy components: the reactor vessel, steam generator, and the components in the reactor compartment. We're going to do those procurements in FY '19.

We've completed the designs for the major electrical components for the electric drive. We're tracking towards full scale integrated testing of the pre-production components, and that testing will commence later on this year and go well through and into 2018 and the start of 2019. We're going to test all these things, full size, actual components.

We are delivering on two Virginia-class submarines per year. There's a steady battle rhythm of milestones which includes commissioning the *Illinois* and *Washington* this last year, christening *Colorado* and *Indiana*, laying the keel for *Oregon*, of which I'm proud to say that Dana Richardson is the ship's sponsor. We've completed sea trials on *Colorado* and *Washington*, and as you would expect the crew and the ship performed very well. All total, there are some 12 ships under construction at Newport News Shipbuilding and Electric Boat.

We're progressing on the Virginia Payload Module. Again, this is that 85-foot section with the four tubes that goes into the Block V boats. The work on the Virginia Payload Module is moving ahead with the submittal of detailed designs. The first payload tubes are under construction, and the machining and assembly of critical components on the tubes is in progress. All of this supports the start of the first VPM construction in FY '19. I'm going to leave it to PEO Submarines, Program Executive Officer Submarines, Mike Jabaley, to talk more about what he's doing with Virginia, Virginia Payload Module, and Columbia.

On other fronts, we're just about a year away from transitioning to the first new moored training ship, the *La Jolla*, and we've already started conversion on the second moored training ship, the *San Francisco*. Meanwhile, there are major changes going on on the waterfront down in Charleston. These include security upgrades, new buildings for training,

and the addition of the engine room team trainer. These high fidelity trainers simulate the forward end of the 688-class submarine, all three levels. To give you some sense of our progress, we have actually landed all three levels on the first interim team trainer down in Charleston, and we're putting the cap on that this week as we speak.

We'll be training on these devices in about a year. We're going to build a second one down in Charleston and we're going to build a third one up at the S8G prototype in New York. All of these efforts are focused on enhancing the quality of our training program and delivering the best operators to the fleet. I'm pretty excited about it. I think it's going to represent a great gain for us.

In Idaho we broke ground on the new spent fuel handling facility. There's a lot of site preparation that has to occur. Again, that is going to replace a 60-year-old facility. This has been a long time coming in our program and allows me to fulfill my obligations for safely handling spent fuel at end of life.

This year we commissioned the *Gerald Ford*, the first new carrier designed in 40 years. There are major propulsion plan advancements in *Ford*. This design benefitted from a lot of design cycles that occur within the submarine force that then informed the work on the carrier. I could take you down there, those of you who build and understand and have operated submarines, I think you would be incredibly impressed with the *Ford* propulsion plant.

Right behind *Ford* we're 36 percent through the man-hours of the production on the carrier *Kennedy*, which is the next one, and that translates to over 50 percent of the structural members being in place. So we're well on our way and it's something to be really excited about.

I want to shift gears and talk about this conference theme today. A friend of mine recently sent me a picture of USS *Jacksonville* that was underway. As you heard in the introduction, *Jacksonville* was a ship I commanded, so she's always very close to my heart. Very soon *Jacksonville* will turn up in Bremerton and she will be there for inactivation and defueling. This will mark the end of a life for a ship that will have served the nation for 36 years, having been commissioned in 1981.

I'm sure many of you can identify with this, but anytime a submarine that you served on decommissions you think of the deployments

made, the missions conducted and the boat's accomplishments. Mostly you think about the people. It probably brings a smile, a chuckle, some great stories and a sense of pride. For *Jacksonville*, that will be the same for me.

When *Jacksonville* was commissioned she was the 12th 688-class submarine, the third of six Los Angeles-class submarines that were built in that year. Think about that. She was born into a fleet of 74 fast attack submarines. According to our math and research, about 50 percent of the force were 637-class submarines, and about 15 percent were 688-class submarines.

We were turning out ships at a high rate: six in 1981, four in 1982, five in 1983. Generally, we were averaging somewhere a little over three ships per year, plus the one Ohio-class submarine that we were turning out at that time. *Jacksonville* was born in the Cold War. She was built to have the speed to keep up with the carriers, and she had numerous Cold War deployments. After the Cold War ended, she became what we called then a battle group deployer, meaning you worked up with the battle group, do certification exercises – we called them COMPTUEX and JTFEX – and then you deployed with the carrier, although frequently, once deployed you operated independently and then you might join a carrier depending on what the world operations were.

Originally Jax was scheduled to be refueled. At some point a decision was made to inactivate here, and then later that decision was reversed and she was refueled at Portsmouth Naval Shipyard in the early 2000s. Then, in 2009, she transitioned to the Pacific, where she has served until the present time.

When I was at SUBPAC from 2010 to 2013, I had a picture of *Jacksonville* maneuvering near the pier in Sepanggar, Malaysia. I liked this picture a lot, and I liked it because of what it represented. It represented a world that we never envisioned when I was a young officer.

It also represented a submarine force that was adapting and evolving to the changes that were going on in the undersea domain and in the world. So Jax, here she was, a Cold War veteran, serving out here last few years on deployments in the Western Pacific and also in the Central Command area. We got our money's worth.

Her last deployment was nearly eight months, with an incredibly

high op tempo and no missed underway obligations. Think about that, a 36-year-old ship, a real testament to the ship and the people that maintained and operated her. When Jax decommissions she will represent the changing face of our submarine force, which is now roughly 68 percent 688s and 25 percent Virginia-class. And that number is changing rapidly because of the full-fledged construction of two Virginia-class submarines per year and a steady program of record that decommissions 688s at about the pace of two per year.

When I think about her three-plus decades of service, I hold up *Jacksonville* as a shining example of what the evolution of our force has been and what we're capable of if we put our minds to it. I think this sets the stage for the discussion about our foundation and our future, and really gets to the theme of this conference about getting faster. Yes, the world is changing fast and we need to stay ahead of it. The central question is, how do we do that? How do we adapt our boats and ourselves to what the nation needs?

We all know that in our reality the construction span takes years. New classes take decades in a world where the pace of change of technology is much faster than that, and our warfighting needs are much faster than that. So how do we respond?

I can confidently say, as Jax gets ready to decommission, that she is still among the most capable submarines in the world. How did we do that? How did we provide a submarine that operated for 36 years, literally operating around the world, and yet by comparison is still very, very capable?

When I commanded *Jacksonville* I once toured a NATO admiral around the ship and he was shocked at the age of the boat. It was then 20 years old. He lamented that younger ships in his navy looked nowhere near as good as *Jacksonville*. I am absolutely confident that if we were to re-enact that when the ship was 30 years old or even 36 years old today, he would still be overwhelmed with the way we preserve, maintain the ship, and the combat capability of that ship.

The answer about how we got there was hard work, yes, a steady day-to-day commitment to standards, but it was also we did this iteratively. Over the course of decades, we made changes to *Jacksonville* at the tactical level. Through necessity we came up with the scheme to

modernize her sonar and fire control systems, and the sonar and fire control systems in the fleet. It was a plan that *Jacksonville* benefitted from. These upgrades not only avoided equipment obsolescence but added tremendous real warfighting capability, including improved situational awareness for the officer of the deck and a greater tactical control over a broader range of the undersea domain.

That same modernization schedule also allowed us to increase the pace of modernization, introducing new capability through successive and progressive cycles of hardware and software changes. That same scheme now serves us very well in our submarine imaging and electronic systems and interfaces now with our electronic navigation systems. During the battle group years, we substantially upgraded *Jacksonville's* communications suite, and have the ability to tap and feed over the horizon targeting support systems.

During battle group operations, we handled a volume of communications that was unheard of on my first boat. In fact, it would have made my communicator's head explode. I remember him going around and trimming out every "the" and "and" and unnecessary adjective from every message we sent, which wasn't very many.

Operating with the battle group was all about adaptation. It was adaptation to a new set of circumstances and a new set of demands. There was a lot of innovation. There was incremental adding of capability. There was learning at sea and then rapidly feeding that back to the force.

An image I recall very vividly during my time in Pearl Harbor as XO was that of a large group of submarine department heads, XOs and commanding officers jammed in a classroom at Pearl Harbor listening intently and questioning two battle group deployers who had just returned from what we called the CBBG deployment, and trying to understand what it took, what we needed to do and how do we get better. By the way, history repeats itself, because I have the same image from my first boat of all officers from the waterfront mustering on the second deck at DEVRON 12 to hear first-hand the exploits of a returning boat. That same image, folks, is the image I have about Admiral Lockwood meeting with his commanding officers during the battle in the Pacific in World War II as they sat in the skipper's lounge and talked about what worked, what didn't work, how we're going to get better and how we're going to

get better faster. There was a need, there was a necessity there.

Over her life *Jacksonville* saw a transition in the mix and types of weapons she carried in her torpedo room, a transition to Tomahawk and Mark 48 ADCAP. This, combined with the communications upgrades that I already talked about, and for that matter for the rest of the submarine force, changed us. We could not only do sea control missions, we could now do power projection missions and we could do them deep inshore.

So as a result of huge tactical system changes on *Jacksonville* and throughout the force, we were able to make impressive contributions to the operational level of war and to the lethality of the submarine force. Those overall tactical improvements also allowed us to contribute to the strategic domain as well. What I find really noteworthy in all of this was the decision to shift *Jacksonville* to the Pacific Fleet

Many of you lived through that and probably know the story better than I do, but the move was emblematic of a submarine force that was maneuvering to stay ahead of the changing tides in the world. This was part of shifting 60 percent of our submarine force to the Pacific, and that, by the way, occurred years before President Obama talked about the pivot to the Pacific in 2011. This ship was the product of submarine force leadership looking at deployment patterns, understanding fleet combatant commander and national tasking requirements, and thinking hard about the future and carrying the case to Navy leadership in a well-crafted position to get a decision.

I'm extremely proud to be part of a force that fought that through, carried it through, got the decision and then executed. I argue that within our culture – the point of this story is – within our culture is the DNA to get at getting faster, and to get at the challenge posed by this conference. Success for *Jacksonville* and the 688 force and our strategic force has always been constructed on a solid bedrock of fundamentals: building the ship tough from the start with the margin and first-time quality that we need; working closely with shipbuilders and industry partners who know their tradecraft very well and deliver very capable ships; and an unrelenting commitment to rigorous maintenance standards.

And by the way, we've had to fight for this from time to time. I recall when we transferred the nuclear-capable tenders out of Norfolk and we

shifted it to shore-based maintenance, that was a change. That required partnering and educating with our shore-side maintainers to make sure that we got our intent of maintaining our boats. There's also reliance on the hard work of trained and knowledgeable sailors to operate and maintain our boats. Those fundamentals include an unrelenting commitment to inspect what we expect, including tactical, strategic, as well as propulsion; and also, to inspect the supporting programs in each of those areas.

There was a commitment to modernize through the forward thinking and tightly synchronized efforts of the fleet, OPNAV, NAVSEA, and this was coupled with a never-ending assessment of the schedule versus resources and see where we need to make tweaks and adjustments. There was also an investment by the submarine force leadership to tell our story, to highlight our missions, to inform defense, administrative and Congressional leaders, while all the time fighting to keep funding for the program. And very importantly, we worked to find and keep the best people that we could get. Once we got them we annealed them in our culture, a culture of constructive dissatisfaction, and we made them a part of our submarine Ohana forever.

Everything we've done with *Jacksonville* and the rest of the submarine force, and everything we did at the tactical, operational and strategic level, was enabled because we got these fundamentals right, due in large part to the folks in this room. All the efforts to go faster start with an unwavering commitment to these standards and these fundamentals. So we turn to the challenge that the CNO has posed to us and articulated in his *"Design for Maritime Superiority."* It's a theme that he has been very vocal about for the last two years, if you've been listening, the challenge of getting faster and delivering and advancing our naval capability across the four lines of efforts in the design, and that I talked about last year.

So you say, Caldwell, what do you mean, get faster at what? I say get faster at the four lines of effort: strengthening naval power at and from the sea, that is delivering the warfighting capability to a fleet that is trained and operated to fight; high velocity learning at the individual, team and organizational level, you can't forget about that; strengthening the Navy team, our people, for the future, including active duty, civilians, reserves, and our families who play a role in this; and finally,

expanding and strengthening the network of international, inter-agency and service partners.

We are in a global competition for the maritime domain. That competition, folks, is very, very real. Our operational commanders, Joe Tofalo and Daryl Caudle, are going to talk about this in their presentations.

The good news is that the CNO's message is out. We have everybody, including the Naval Submarine League, talking about it. Get Faster. And now, we actually have to get faster.

It's time to execute. So how do we do this? I'm going to give you my thoughts on it. Using the history of *Jacksonville* as a lesson, I want to make several points.

We must continue to do the fundamentals very, very well, and we must attack anything that weakens those fundamentals. I'm confident that the force commanders have this exactly right. One of those fundamentals is our strategic deterrent mission. We can never waver on that. That is the submarine forces' core capability and contribution to the national defense.

The second point, iterations matter. We didn't wake up one morning and decide to press the easy button and end up with *Jacksonville* at 36 years of service with all the modernized fully capable sonar, fire control, weapons and electronic suites. We iterated with an unrelenting determination that was fueled by this DNA of constructive dissatisfaction, a culture for never settling for second best.

The art now is to figure out, how do we make those successive iterations happen quicker? And additionally, how do we learn as industry and partners side-by-side? Think about my example about talking in the ward rooms and at DEVRON 12, bringing the people together and talking.

Third, we need to open up our aperture on our thinking. Getting faster and improving warfighting capability on *Jacksonville* was a heck of a lot more than just acquisition. In fact, I charge all of us to think about how we broaden our thinking in areas of training, tactical development, maintenance, ordnance, deployment, operations and developing our warriors. These all contribute to warfighting and our central focus of owning the undersea domain not only today, but well into the future.

On top of that, I offer an amendment to the wise words of one of my predecessors, Admiral Bowman. Recall the five gets. I know you

know them. *Get connected, get payload, get modular, get electric, get affordable.*

If you haven't pulled this out Google it. Go find that. You'll find it's still very relevant. You'll also find that we've made some great progress. It's a nice model for thinking about where we can go add effort.

But now we need to add and amplify that a little bit, and the next get is *get off-board*. We've got to grow the arms and the reach of each individual boat. The path is through off-board vehicles, sensors and networks. By the way, I don't think these have to be carried organically on a submarine, but we have to be able to use them. And we need help from our industry partners.

I'd like you to think about it in three phases. One is, what is the capability you can add to Virginia-class now, so we can learn and adapt and iterate quickly? Using what we learn from that, what can we do to expand our thinking about the opportunities that might be present in the Virginia Payload Module tubes? And subsequently, learning from that, what do we learn and add to the next design for the next SSN?

Finally, folks, getting faster is absolutely dependent on stable and predictable funding. We can't win, we can't execute efficiently, if we have to redo our planning every year. There are many examples where that inefficiency has caused us problems. So, getting faster is on all of us.

The good news is that your submarine force leadership team is moving out. Vice Admiral Tofalo and Rear Admiral Caudle are going to tell you about the things they're working on across the full spectrum of their responsibilities. I like what they're doing. There's a lot of things to be proud of, but there's more work to be done.

Mr. Brian Howes from N97 is going to talk to you about something we call TSEP, Tactical Submarine Evolution Plan. That's the approach to continue to improve our platforms, whether it's Virginia or the next SSN. It's a great start. It's a building block that brings all the right players together in a recurring dialogue with an action plan to drive us to the best direction we can. Brian is also going to talk about the family of UUV, Unmanned Undersea Vehicles.

Rear Admiral Mike Jabaley is going to talk to you. He's the Program Executive Office for Submarines. He's working to integrate our build

strategy for Virginia, Virginia Payload Module and Columbia, and to figure out, how do we buy those components more efficiently; including, how do we leverage buying for the carrier programs to make them more efficient and to de-risk the work that we need to do on Columbia? Separately, I think you could challenge me and say, Caldwell, I hear you but go fast to where? Where are we going?

Well, we're working on that too, and we're working with the War College to help us think about the future demands of the force. Where will we need to operate? Where will we need to operate? What missions might we be assigned to do? What capabilities matter most? What partners need to be included in our discussion?

We're calling this the Alternate Futures Study, which seeks not to predict an exact specific future, but to give us a range of alternative futures in the 2040 timeframe that we should plan to. We will use the Alternate Futures Study to inform our decision regarding future capabilities and operational requirements, not only for the next platform but for other investments in the undersea domain. In this effort we've brought in expertise from a broad range and a broad spectrum of disciplines. We started the discussion at the un-class level and we're progressing into the classified level. I'm pretty excited about this and I think it's a great partnership with the War College.

As I close here, I would like to say the challenge that the CNO has issued, and that you've issued in your conference them about getting faster, is a calling for all of us. Since the first days of our submarine force, we have sought to improve our ability to support the nation. I've discussed *Jacksonville's* life, but there are many similar stories throughout the early days of force during World War II and during the Cold War.

One thread runs through all of this. The center of gravity for everything that we do is our people, the men and women in uniform, our civilians and our leaders and our partners in industry, and also our Congressional supporters. The type of people that I'm talking about are the ones who believe in what we're doing, who sacrifice time with family and friends to go to sea, who work the long hours at sea or at shore to solve really hard problems, and who are willing to stand on that roof and install your TV aerial, if you're so inclined to do so today.

We're going to answer the call that you've issued to our people.

There's a saying I picked up at the American Nuclear Society plenary this week, and it goes like this. If you want to go fast, go alone. If you want to go far, go together. Well we want to go far, and we want to go fast, and we're going to have to figure out how to do that both with industry, with our Congressional team leaders, and with our military folks.

Ladies and gentlemen, thank you. I'm honored to have had the chance to talk to you today.

NAVAL SUBMARINE LEAGUE
35TH ANNUAL SYMPOSIUM

UNITED STATES SUBMARINE FORCE: GETTING FASTER

VICE ADMIRAL JOSEPH TOFALO, USN
COMMANDER, SUBMARINE FORCES

Admiral, thank you for that kind introduction, and thanks to the NSL for hosting this fantastic event. It's a pleasure to be here today to speak to the symposium's theme, "Getting Faster," so crucial given the extremely competitive world we now live in, and also provide an update on what the Submarine Force has been up to.

Let's start with the theme—"Getting Faster," For me this means, end-to-end as an organization, getting faster in our learning, processes, operations, innovation, and acquisitions. I'm not talking about rushing things, we're bold not reckless, but I am talking about ensuring we as a Submarine Force can quickly learn and adapt at every level; from the Engineroom Lower Level deckplate to the 5th floor of the Pentagon, in government and industry, from the tactical to the strategic. It means acknowledging our long tradition of excellence, but also recognizing that if you're not getting better, you're probably getting worse, because someone is trying to pass you. It means realizing that we are engaged in a competition requiring innovation to win, but that innovation may involve some failure. It means challenging institutional inertia by removing administrative distractions and cumbersome procedures that don't add value and slow us down.

So if that's what "Getting Faster" encompasses, why now? The bottom line is that we find ourselves in a great power competition at sea for which a sense of urgency is absolutely required, and for which second place is not acceptable. Russia and China are working hard and fast to strengthen their position, influence their neighbors, and shift the world order in their favor. Iran challenges security and commerce in their region, including providing lethal assistance to those who would do us harm. North Korea's reckless and provocative missile tests inform its advance toward the goal of a nuclear weapon that can threaten the Unit-

ed States. In competition, time matters—the best Navy in the world can still lose if it shows up late. And by "late" I don't only mean physically, but also in acquisitions, readiness, and tactics. "Lateness" can be manifest in: maintenance delays on existing ships that limit current operational availability; being late-to-need in our ability to counter threats to enablers like satellite communications; or force structure shortfalls that don't get solved until a decade from now. Given all this, I think the case for "Getting Faster," and its associated sense of urgency is clear.

To more completely understand this sense of urgency, we need to look at our mission and the situation we face. Per U.S. Code, the mission of the Navy is to be prepared to conduct "prompt and sustained combat operations at sea," and the Submarine Force does its part of that mission in and from the undersea domain. Given that approximately 70% of the world is covered in water and 80% of the population lives within a few hundred miles of an ocean coast, we have quite a lot to cover. It gets even more interesting when you realize that 90% of global commerce travels on the water and that near 98% of intercontinental communications, including financial transactions, travel not by satellite, but via underwater cable. You hear a lot of talk about "the cloud" in our information age, but the CNO has pointed out that it might be better to call it "the sea" because that's where most of the data actually travels. Our prosperity and security as a maritime nation depend on this domain and the associated flows of goods and information. As a Force, we are charged with exploiting the unique advantages afforded by undersea concealment to secure these accesses for ourselves and our allies, and threaten those of potential adversaries, putting them on the defensive in their own back yards if necessary.

The character of this environment has always been in constant flux but the current rate of change is increasing exponentially as global maritime and information systems expand and technological advancement accelerates. Now add in the fact that it's a competition. Thinking adversaries are out there studying us and innovating. For the last 15 years, our Navy primarily supported a land war in the Middle East, with emphasis on power projection ashore and fighting from uncontested sanctuary in the littorals. In contrast, over the next 15 years our emphasis must instead be on high-end combat in deep blue water. We're seeing a return

to great power competition at sea; an environment where we've enjoyed uncontested superiority for decades. I cannot say it more succinctly than the CNO did earlier this year: "Our adversaries are improving more quickly than we are. We must increase our naval power today, pick up the pace, and maintain our winning advantage." That means revitalizing our sea power to increase our ability to decisively win high- end conflict at sea and deter conventional war while simultaneously maintaining our strategic influence. As adversary systems proliferate that are designed to deny our Navy vast ocean areas, the share of the Navy's responsibility that falls on U.S. submarines with their unique access, will only grow. The winners in the competition we face will be those who can keep up with the changes; the winners will be the ones that, as the symposium theme states, are "Getting Faster."

All of this makes for a challenging, dynamic, and busy time for the Submarine Force. It's also why this is a great time to be a submariner! As I speak to you today, your Submarine Force is "on scene, unseen"—providing strategic deterrence and forward presence all around the world. Let me tell you a little bit about what we've been up to and how we're meeting the challenges we face.

I'll start with the mission-set that the Navy Design calls "foundational to our survival as a nation." I am of course talking about strategic deterrence. Secretary Mattis has also said: "maintaining the nuclear deterrent is the number one priority of the Department of Defense." Living as we do in the aftermath of almost two decades of combatting violent extremist organizations, it is easy to forget that in the 300 years prior to WWII and the 1945-advent of nuclear weapons, the major powers of the day were involved in five to seven great wars per century. An estimated minimum average of 1% of the world's population died each year due to armed conflict, with huge spikes during WWI and WWII. In the 70 years since the 1945-introduction of nuclear weapons, that average percentage drops by about a factor of 10. We've certainly had terrible regional conflicts and terrorist acts, but major power war has been prevented. We lost approximately 3000 people on 9/11, an absolute tragedy. But consider that by many estimates, over 70 million people died in World War II. That's major-power war, and I submit that strategic deterrence has prevented that from happening for the last 70 years.

The Submarine Force continues to play its important part in strategic deterrence today; with 14 SSBNs consistently meeting STRATCOM requirements and providing a safe, secure, and effective strategic deterrent, including approximately 70% of the nation's accountable warheads under the New START treaty. Over the past two years that force has conducted 52 strategic deterrence patrols and demonstrated the reliability of our weapons with 10 successful D-5 missile launches. Every day, U.S. submariners demonstrate a broad world-wide two-ocean deterrent, made manifest in the past year by SSBNs surfacing in places as far west as Guam, as far north as Dutch Harbor, Alaska, and as far east as Faslane, Scotland.

Of course, the mission of the United States Submarine Force extends beyond strategic deterrence. Nuclear-powered submarines have a unique ability to project power far forward, opening doors that might otherwise be closed to the greater Joint Force, and holding critical adversary assets at risk. Our 50 SSNs and 4 SSGNs are on the job, consistently providing access with influence, vital intelligence, conventional deterrence, and when necessary, unparalleled warfighting capability all over the globe. At any given time, our SSNs and SSGNs are deployed far forward supporting Combatant Commander missions in ways that only a nuclear-powered submarine can. To maintain that tempo we've conducted 44 SSN deployments and 15 SSGN crew cycles over the last two years. That's absolutely amazing, and a testament to our outstanding readiness.

I mentioned earlier that our SSNs and SSGNs have spent much of the last 15 years supporting land warfare. A return to great power competition at sea means looking at mission sets we've not had to focus on as much, such as sea control. To support this, we've re-invigorated submarine tactical development by: establishing the Undersea Warfighting Development Center with new lines of effort; re-organizing and re-kindling our Tactical Analysis Group; and increasing the number of tactical development exercises. Submarine tactical development is on an aggressive glideslope towards refining our tactics and skills for the high-end fight. Beyond tactical development, we've increased the amount of high-end sub-on-sub tactical experience that our crews get exposed to. This experience is extremely useful in preparing for high- end warfighting as well as challenging peacetime missions.

All of that said, Secretary Spencer made a comment recently about the Navy's rucksack being pretty heavy, so I'm mindful that if we put something in, something else needs to come out. So we've fine-tuned our Fleet Readiness Training Plan to support our emphasis on the high-end fight in a number of ways. We've started by restructuring the way we do Tactical Readiness Evaluations. Previously, these evaluations assessed some competencies which were duplicative of areas owned by the Squadron Commodore or assessed elsewhere, such as during the Pre-Overseas Movement Evaluation. Now TREs focus almost exclusively on warfighting readiness, which ensures the TRE is focusing on the high-end fight. Furthermore we eliminated a low- payoff basic training period for crews that are coming off a deployment vice coming out of a shipyard. We also tweaked the spacing of focused training periods led by our Submarine Learning Centers to enhance their effectiveness, and restructured the POMEVAL, or deployment certification, with a focus more on the challenging peacetime missions a deploying submarine is about to go do.

In our operations and tactical development we are conscious of both historical commitments to allies as well as keeping abreast of changes to the future warfighting environment. I've already mentioned visits by our SSBNs to foreign ports, and our SSGNs and SSNs have recently been in the news making port calls to South Korea. We've already started working with our allies on our plans for ICEX-2018, and have conducted extensive Theater ASW operations with the U.K, France, Norway, Canada, Japan, South Korea, Australia, and other European and western Pacific nations. We continue to coordinate with South American navies, including Chile, Peru, Columbia, and Brazil, to foster regional naval cooperation, promote regional maritime strategy, and provide mutually beneficial advanced ASW training to each partner-nation.

So I've described how Forces Afloat are "Getting Faster" by adjusting our training and operations to match changes in our environment. But to stay the best submarine force in the world we also need to own the best undersea systems and platforms. This means buying the best submarines, and then maintaining and modernizing them when needed.

Of course the biggest news here is the COLUMBIA- class replacement for the OHIO-class SSBN. The Undersecretary of Defense for Ac-

quisition signed the Milestone B decision memorandum earlier this year, and as I speak to you today we are literally bending metal for this vital modernization program.

The other big news is in the VIRGINIA-class program. When USS *Washington*, the second FY11 ship, was delivered last May, the Navy was now at full production of two VIRGINIA-class SSNs per year, both authorization and delivery, after two decades of zero to one. And we've maintained the pace with COLORADO's delivery last month. The VIRGINIA-class program is a posterchild for "Getting Faster" in our acquisitions by evolving in stride a proven design. Just this year, the first of our Block III VIRGINIA's, the USS *North Dakota*, conducted the first launch of a Tomahawk Land Attack Missile from a VIRGINIA Payload Tube, demonstrating a system that will help us keep pace with the ever accelerating rate of technological change by offering more flexibility in the payloads our submarines carry.

Our quest to own the best is not just about submarines but it is also about owning the best supporting systems, including off-board and surveillance systems. The future force must grow longer arms to expand and maximize our effective reach from the undersea. This includes range and geographic area, the breadth of effects we deliver, the domains we impact (undersea, land, air, surface, cyberspace), and the influence achieved through a system of undersea forces. Covering additional area and mission capabilities by adding a family of unmanned vehicles to the Submarine Force tool kit is very important to us. That's why we stood up Unmanned Undersea Vehicle Squadron ONE this past month. This historical event demonstrates the Submarine Force's commitment to the future of unmanned undersea systems and acknowledges their place in undersea warfare.

However the very fact that we stood up a squadron full of 'people' to support 'unmanned' demonstrates the timeless truth that it's the people who are our real national treasure and who bring any machine to life; from design and build, to maintain and operate. And I am here today to tell you that the quality, dedication, and drive of this generation of undersea warriors is eye-watering. There are a number of initiatives I'm excited about across the Force that I want to share with you today.

First off, the crews of our submarines are more male- female inte-

grated than ever before. As I speak to you today, a fifth of our crews are already integrated, including 14 OHIO-class and 4 VIRGINIA-class. These crews are completing deployments in support of each and every mission our submarines can perform around the globe. Our first female submarine Line Officer recently completed Department Head training and returned for a second sea-tour as an SSN Engineer. Out of our first year group (YG10) of female submarine Line Officers, we exceeded our goal for retention to Department Head by over 10%.

On the enlisted side, we have over 75 enlisted women serving aboard four integrated SSGN crews. The first enlisted female was awarded her dolphins last fall, and USS *Michigan* completed her first mission as an integrated crew in the Spring of this year. USS *Florida's* first enlisted women are in the process of reporting aboard and will complete that process throughout the remainder of 2017. The selection of USS *Ohio's* first cohort of enlisted women is complete and they will begin to report this Fall, with the Chiefs reporting first followed by E-6 and below—this will continue throughout 2018. Finally, we've updated our enlisted Women in Submarines plan to integrate two more VIRGINIA-class submarines, *New Jersey* and *Iowa*, following officer integration.

I mentioned earlier that we're revising our approach to training and tactical development to focus on the high-end fight. We're also learning to look at human factors and safety in new ways. The Force Improvement and Operational Safety, or FIOS, program is the lynchpin of this effort. We are using it to strengthen our culture of continuous assessment and improvement. You may be familiar with our 2015 policy that all submarines now operate on a 24 hour sleep cycle to reduce crew fatigue and mishap risk. That work was one of the first FIOS initiatives. Within the last year, we've also implemented an Operational Safety Officer aboard each submarine. This individual promotes the unit's operational safety culture, provides an independent safety assessment directly to the unit's CO, and manages incoming and outgoing lessons learned. We've also added a full chapter on human factors to the Submarine Contact Management Manual. This is the first chapter in a submarine tactical manual dedicated to human factors in tactical performance. The new chapter solidifies the results of two years of analysis regarding human factor contributions to contact management deficiencies. Given that roughly 85%

of the Navy's mishaps and near misses are caused by human error, we predict that we can better prepare our watch team leaders and operators by giving them a better understanding of the human factors that lead to poor decision making and error. This ultimately should reduce risk and improve mission success. Another example is how we are using evaluations of technical, behavioral, and organizational factors to proactively, vice reactively, identify leading indicators of team performance. This process can provide unit commanders an additional assessment tool to assist them in evaluating their crew and give them a sense of whether their team performance is trending negatively. Finally we are promulgating new Operational Fundamentals evaluation guides in three areas: Assessment & Improvement, Team Dynamics, and Operational Planning. These now give ships, and external inspection and certification teams, a formal and force-wide standard against which to evaluate these foundational competencies.

Another area I'm particularly proud of is the way that we are integrating modern performance psychology into a cohesive program to build Sailor toughness and resiliency. Our Embedded Mental Health Program places trained mental health expertise on the waterfront in each submarine home port. Our approach is preventative vice corrective, and is evidence based. We've used a standard psychological instrument to assess improvements in toughness over time. We introduced the program in Norfolk and piloted it there for three years, and the impact has been pretty dramatic. From 2014 to 2016, in Norfolk where the Embedded Mental Health program was piloted, we saw an 87% drop in psychological unplanned losses. Needless to say, we think there's a "there, there." Furthermore, our toughness and resiliency efforts are more than just making psychological resources more available on the waterfront. By embedding the providers at the waterfront we've also opened an extremely healthy dialogue between the mental health professionals and the submarines' leadership. This new feedback loop helps open the aperture of the Officers and Chiefs, allowing us to get to the left of issues in a more proactive vice reactive way. To further open that aperture, we also instituted an Executive Coaching program for COs and XOs, adding more tools to their leadership toolboxes, and it has been so well received that we'll be expanding it to the Chiefs of the Boat next year.

I'm also proud to report, that the Submarine Force is doing well on retention. Our first and second term Enlisted retention is 65% and 80% respectively, both about 25 points above the Navy average. We're constantly working to take care of our people and give them job satisfaction, and there is certainly no question for them as to the importance of the Strategic Deterrence and Theater Undersea Warfare missions.

On the Officer side we recently conducted the first Junior Officer retention Survey in over 10 years and got triple the number of responders than the typical Navy survey. With Submarine Learning Center's assistance we convened our first JO Symposium with officers from each submarine homeport represented to review the survey results and develop solutions. We have already taken action on the outstanding feedback, and I'm happy to report not a single "red detail" or forced assignment for a Junior Officer in over a year – that's huge!

All of that said; we do have challenges that we need to address as well. The CNO frequently talks about the "triple whammy:" unrelenting operational requirements; an austere fiscal environment punctuated by the Budget Control Act caps and sequestration; and a lack of stable and predictable funding. Regarding the Budget Control Act, SECDEF has said in congressional testimony that "no enemy in the field has done more to harm the warfighting readiness of our military than sequestration." Regarding unpredictable funding, we've operated on a Continuing Resolution for over a third of the last nine years. These conditions complicate readiness generation in many ways, but it's perhaps most poignant in our Public shipyards. There are numerous reasons for how we got to where we are, but the bottom line is that we have a workload-workforce mismatch, lagging infrastructure investments, and an associated backlog that impacts our Force's operational availability. In the past 8 years, 6 SSNs have taken or are projected to take 50%-100% longer to complete their overhauls than expected, with the shortest delay a non-trivial 11 months. I will point out that despite this, USS *Rhode Island*, an SSBN, is currently on track to complete her overhaul in a record 27 months despite these other delays—another example of the emphasis we put on Strategic Deterrence. The good news is that military and civilian leadership recognize the significance of the situation, and for 2017 Congress approved about $13B above the Budget Control Act for things

like Navy readiness, and for 2018 the President's Budget request likewise has about $50B above the Budget Control Act, again for things like Navy readiness. We've also shifted about 1 million man-days of work in SSN availabilities over five years, from public to private shipyards. This will certainly help with that workload-workforce mismatch I mentioned. Nevertheless, with 70% of our accountable nuclear warheads on 14 SSBNs and an unwavering Combatant Commander demand solidly on the shoulders of a diminishing number of SSNs and SSGNs, you can see why any shipyard delays have my full attention. The Constitution says that we must "provide and maintain" a Navy, so we've got to ensure we also get the "maintain" part right.

So for this audience, made up predominately of industry and government, as I conclude my remarks, I want to leave you with some thoughts for what you can do. This is not intended to be an exhaustive list, but it's certainly a great place to start.

• The first won't be a surprise: they didn't pick today's theme out of a hat. We need to be "Getting Faster," in learning, processes, operations, innovation, and acquisition. As the CNO states in his *Future Navy* White Paper, "the competition is on and pace dominates...in an exponential competition, the winner takes all…we must shake off any vestige of comfort or complacency that our previous advantage may have afforded us…"

• Second, we need first-time quality. There's a tension here between speed and innovation, which may involve some risk, and the steady production of high quality capability. We need to learn to thrive in that tension if we want to win. Don't misread me, I'm not saying it's okay to fail—it's not. But we have to have some tolerance for failure. As John Paul Jones said, "those who will not risk, cannot win."

• Third, regrettably first-time quality alone is not enough, for we also need it to be at as low a price-point as possible. This in itself is a place ripe for innovation.

• Fourth, we need upgradable designs that allow for rapid updates as technologies mature. Said another way, we need to "bake in" "Getting Faster."

• Fifth, we need rapid, expansive and resilient networking to allow us to enable many more combinations of platforms, sensors, and pay-

loads. This is at the heart of ADM Davidson's *Fleet Design* and its core elements of Integration, Distribution and Maneuver.

• Finally, we need to continue to do better in the vital area of cyber security. Every industry and government partner in this room has an obligation to aggressively guard against the theft of our nation's intellectual property.

Again, not an exhaustive list, but certainly some good food for thought.

Yes, the competition is fierce and second place is not an option. However, I have two profound reasons for hope. As I look out onto this audience I see a tremendous collection of extremely smart and energized industry and government partners. I also have the distinct privilege of leading the finest Submarine Force the world has ever known. With this one-two punch, we are unbeatable.

May God bless the Navy, our Submarine Force, and the United States of America. Thank you.

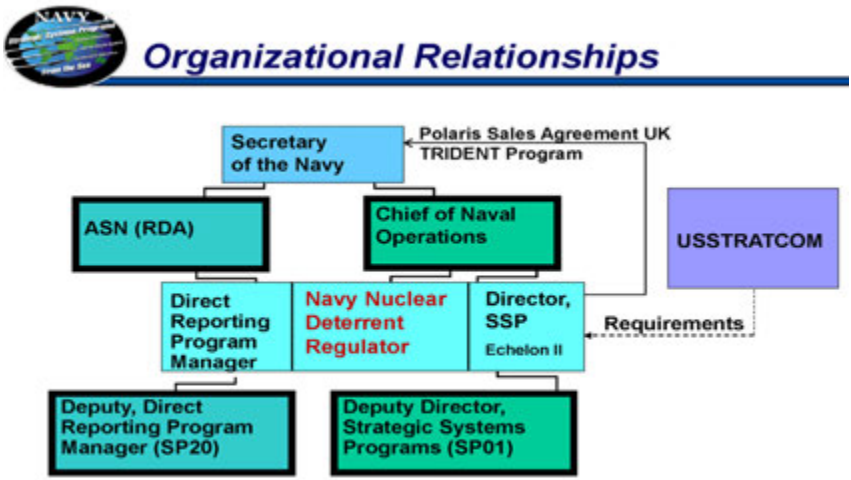
NAVAL SUBMARINE LEAGUE
35TH ANNUAL SYMPOSIUM

UNITED STATES SUBMARINE FORCE: GETTING FASTER

VICE ADMIRAL TERRY BENEDICT, USN
DIRECTOR, STRATEGIC SYSTEMS PROGRAMS

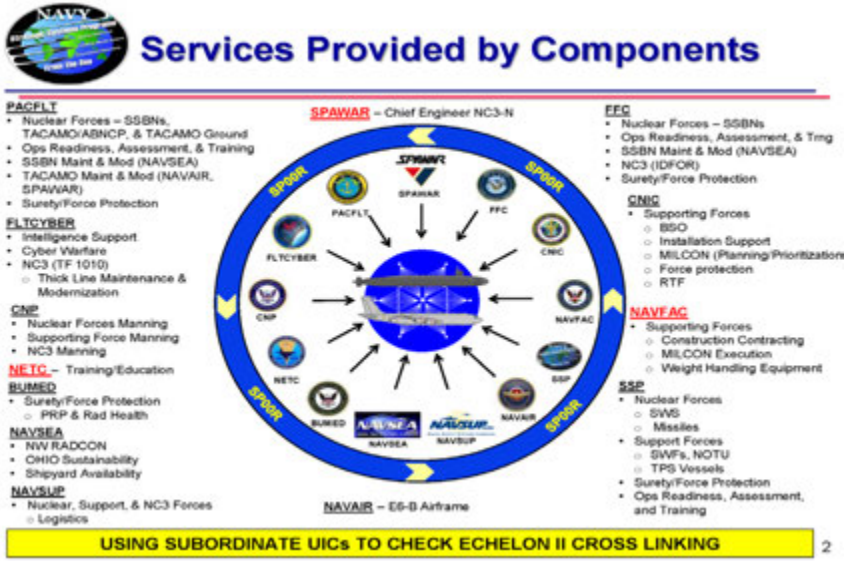
Good morning, ladies and gentlemen, and again thank you for the opportunity to present the work done by the men and women of Strategic Systems Programs. I appreciate the opportunity to kick this off today. I've got a lot of information to present to you today. I will use this forum as my report card to this community on where we stand, what our progress is, what are our challenges are, and where are we headed. I've got a lot to present, so I'm going to push a lot of information to you this morning and then hopefully I'll have some time at the end to take some questions. But let me get rolling here.

Let me start with this, and I'd like to focus on the red block in the middle. This is a new responsibility that the Secretary of the Navy and the CNO assigned to the director of SSP, and that is to act as the Navy's



nuclear deterrent regulator. We started with a clean sheet of paper and we've been working that for the last two years.

Essentially what CNO Greenert asked us to do was to look at all the other commands in the Navy that provide services and support to the Fleet to ensure that we, at all times, can do the mission assigned to the United States Navy for Navy nuclear deterrence. So we have worked collaboratively with all these other commands to come up with an infrastructure. The basis of this is to provide the CNO quarterly updates, but most importantly once a year -- and I just delivered my second report to the CNO -- an end-to-end assessment of where we stand in the Navy, where the shortfalls are, and then we bring those up through the N-STAR (Deputy CNOs) committee in the Pentagon up to the CNO for his focus as he develops the budgets and moves forward.



The three commands in red are commands that we added just this year: NETC for training and education to ensure that we are delivering to the fleet officers and enlisted with the right skill set to do the Navy nuclear deterrent mission; SPAWAR, who has been assigned the responsibility as the chief engineer for the NC-3 part, the Navy's portion of that; and then NAVFAC, because there is such a propensity of programs and projects moving through the system right now that are critical for us

to deliver the Columbia-class submarines. So, this second report to the CNO is a very extensive report, and I'll just give you the bottom line, which is we are in good shape to continue to deliver 70 percent of this nation's strategic nuclear deterrent.

These have been my five priorities for the time I have been the director. People, Wholeness, which is another word for, do I have the right amount of money and do I have the right amount of money in the right appropriations to execute the mission? D5-LE2 - I'll focus a little bit more on that later, which is what's coming down the road. Infrastructure and Capabilities, and finallyEnterprise Information Management.

Let me talk about people. In the last two years, I have done a turnover plan of all my commanding officers that report to me as an echelon II. That turnover is complete in preparation for my departure as the director. Wholeness, I've spent a lot of time with Mr. Stackley ensuring that I had the right appropriations in order to execute both the program of today and the program of the future. D5 LE-2, I'll address that in the future. Infrastructure and Capabilities, we have had the same industry partners since the beginning of this program on sole source contract. That's good.

The problem that we face is some of those industry partners are located in geographic parts of the country which is making it very expensive for us to sustain the talent necessary to get this program through 2084. So, the major move that we initiated with Lockheed is we made a decision to move the FBM program out of Sunnyvale, California. That's huge.

We have been in Sunnyvale, California since 1956 when we started the program. I just met yesterday with Marilyn Hewson, and that effort is well underway. We'll move the remaining 650 people that are in the program in Sunnyvale.

Half of them, the design engineers, will move to Denver, Colorado, which is where Rick Ambrose has base systems programs. The remaining half will move down to the Cape, where we have over the last two decades moved 650 people out of Sunnyvale. So we'll be about 1,000 people strong, 1,000 Lockheed Martin people strong, at the Cape down in Florida.

That's a significant cost savings, cost avoidance in the future, as we work with N97. We've estimated that's somewhere north of $60 million

a year rate differential by moving out of Silicon Valley as they're pressurized with the dot.com infrastructures.

Enterprise Information Management. We love our paper in SSP. We have more paper than probably anybody in the Navy. We have processes, we have procedures, we have instructions, we have operating documents. We love our paper.

The problem is as I turn over the workforce and I bring in the next generation of engineers and support folks, they don't like paper. They like their phones, they like electronic formats. So we have an extensive effort ongoing of taking all the lessons learned, all the good information, all the required processes and procedures, and transferring that into a format that will support not only this current workforce but more importantly the workforce of the future as we move towards 2084.

That is not an insignificant effort. That's a program in and of itself. We build missiles and we do special weapons – we don't do information management. I will tell you it's not simple, so we're learning a lot as we go through here. But I think this is necessary if we're going to keep a viable workforce moving forward.

I'll talk extensively through the system. Let me just kind of give you the key code on this. Green means those subsystems are, in my mind, done, certified and we're in production in support of the fleet.

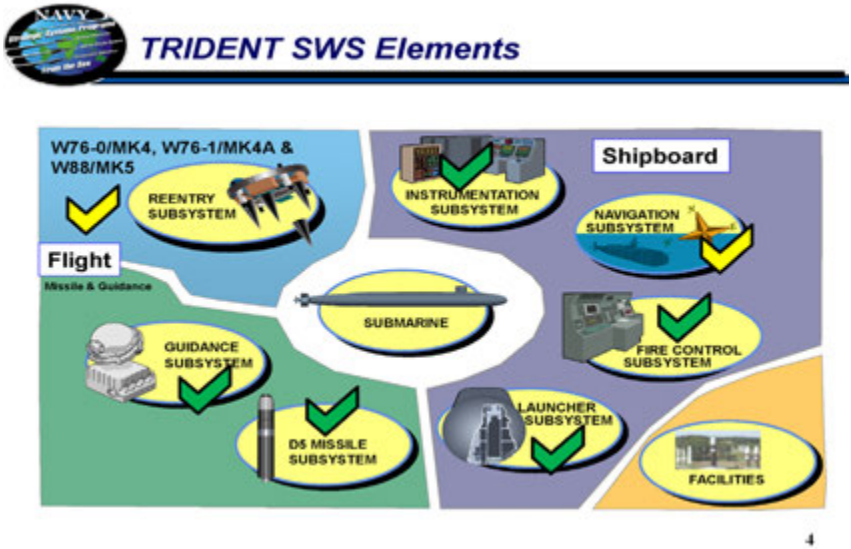
The two in yellow don't mean I have problems or I'm not on track. What they mean is they're not done yet. And I'll spend more time talking about that as we move forward.

Let me talk about the flight systems. Again, yellow is not bad. Yellow means I'm on track, I'm on schedule, but there's still work to be done.

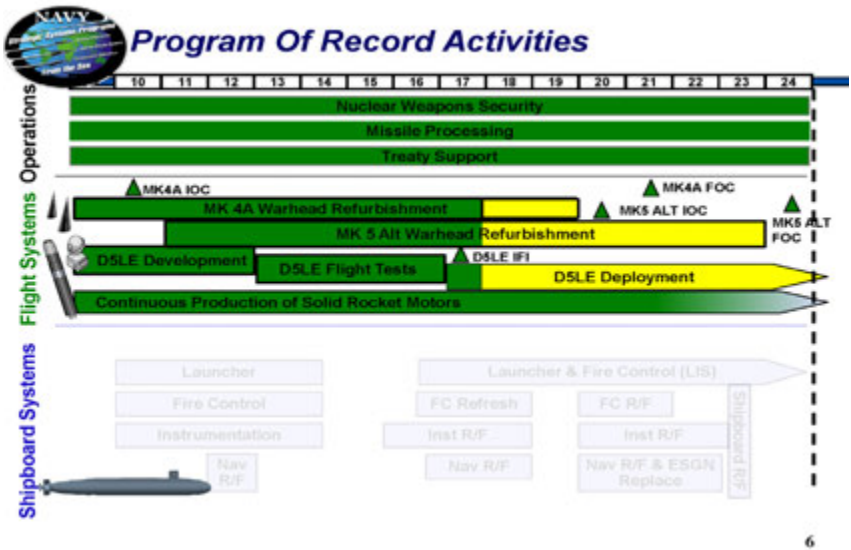
In the Mk-IV-Alpha warhead refurbishment, again Trident can carry two warheads, the Mk-IV and the Mk-V. The Mk-IV, in concert with NNSA and the DOE, we have just surpassed 88 percent of production. We will finish that production program next year. That warhead is then viable for decades into the future. That's very important.

On the Mk-V-Alt warhead refurbishment, again we are right on track for the IOC in December of '19. That is not only a new arming, fusing and firing circuit on that warhead for parts obsolescence, there is also, at the direction of the Nuclear Weapons Council, a conventional high

explosive refurbishment in that warhead. And again, that warhead will be good for decades into the future.



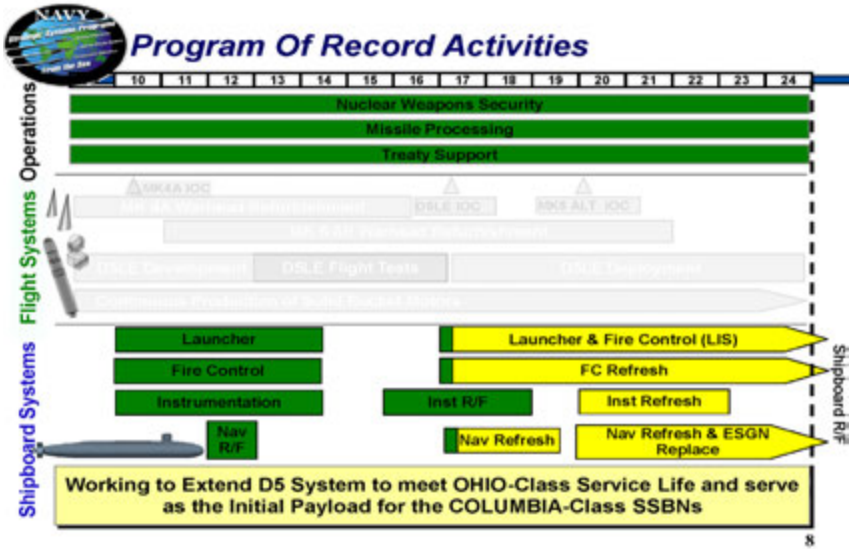
We've come through all the D5 LE flight tests. I now have D5 LE missiles deployed on six submarines in the Fleet, enough that I can start the CET program, the commander's evaluation program for



STRATCOM this fiscal year. So, we'll start flying those missiles for score. I have every confidence that we will meet our commitment that the D5 LE program and the D5 program are identical in terms of reliability and accuracy. And so STRATCOM is planning on targeting those identically, which is a major issue with STRATCOM. That was a commitment that we made.

We remain in continuous production of solid rocket motors. We are the only strategic asset in production for solid rocket motors at Orbital ATK, and we will continue that into the future.

Let me talk about shipboard systems for a second. Again, shipboard systems has been a real paradigm change in SP over the last two decades, specifically here, and I'll talk from 2010 forward. We went to a concept called Shipboard Systems Integration where we made a commitment to the operational force that we would get on the boat, do the modification, and get off the boat within the 35-day refit cycle.



So if you picture that, there's a picture and I'm cutting that picture into small bite-sized pieces. I have to get it in -- I have to get in, do my work and get off in 35 days. The challenge is, whatever I leave has to be certified to launch a strategic asset.

So from a technical standpoint, this has been a real challenge in order to execute this plan, in order to get us to that line there in '24, which is my baseline that I will deliver to PEO Submarines and Admiral Goggins in PMS-397, and that will be the baseline for the Columbia-class. So, we are marching through this.

The launcher and fire control LIS system, that is our effort to put lasers as the initiators on the gas generators for the launcher subsystems instead of electro-mechanical initiation. That is a huge A-subzero give back to the fleet because I can break that firing circuit without removing the missile in order to do any launch tube work. We'll put that on Ohio. We'll certify that. That gives me some A-subzero back through the life of Ohio, but that will be the baseline on Columbia and that will be time back to the TYCOMs and the operational forces.

The fire control refresh and the nav refresh, we broke the nav subsystem into two pieces, the shipboard components, the cabinets and the move to COTS in nav. We have completed five boats in that nav refresh. And when we do that, we have to match in fire control.

The nav refresh and ESGN replacement is the last and it is my critical path to get to Columbia. We will replace the ESGNs with new technology. We have come through all the lab testing. We have had those new IFOGS on the USNS Waters, which is our surface ship, for the last 18 months, over 2,500 hours at sea. We are today implementing two Temp Alts - one on an East Coast submarine, one on a West Coast submarine. We will place those IFOGS in the third position on the bed plate, on the binnacle, and we will put those to sea for an extensive period of time and test, matching their performance against the existing ESGNs. And when we have appropriate confidence, we will then remove the ESGNs and put the IFOGs in as a replacement. So again, we'll use the Ohio, we'll get the Ohio in that configuration with absolute confidence as we move towards the Columbia-class. That's right on track.

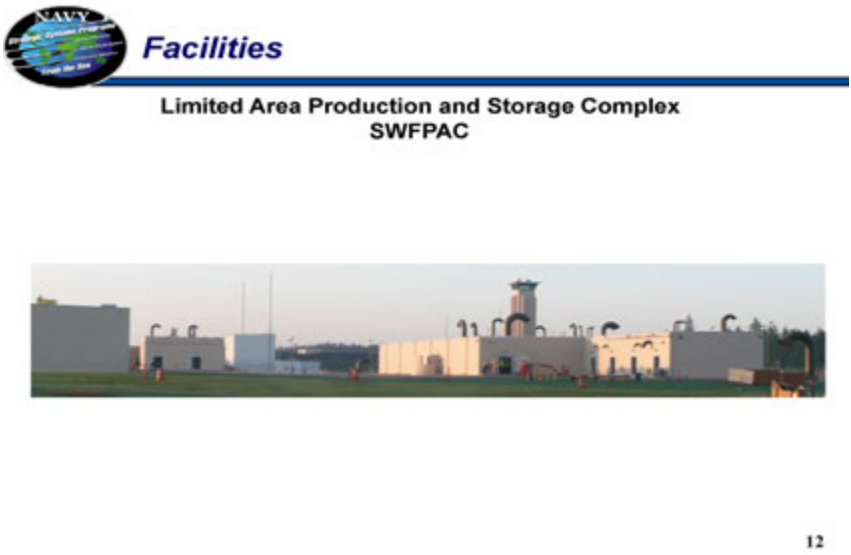
Let me talk about facilities for a second. We just recently had EHW2, our Explosive Handling Wharf number 2 down at SWFLANT, returned to us. That was stripped down to bare bones and totally refurbished. That facility is now good for 30 to 40 years in the future. We are in the process today, and we will certify authority to use, Explosive Handling Wharf number 2 at SWFPAC.

If you remember, that was a single point failure. We had one EHW out on the West Coast where the majority of boats are today. The leadership decided that was an unacceptable risk. We have built this facility, and as I said, we are in literally the absolute final months of certification.

That will be opened to the Fleet here early next year. That's a major step forward in risk reduction as we move the program forward.

The perimeter intrusion detection and assessment system or PIDAS. That is basically taking the entire waterfront at both Kings Bay and Bangor into a secure posture for nuclear weapons security. The infrastructure is in place. The sensors and all the security systems are in place, and we are in the final phases of grooming and certifying that system. That will be fully operational in 2018, and we're moving right along with that. That really upgrades the security posture on the waterfront at Kings Bay and Bangor.

Again, the limited area production storage complex – or LAPSC. This is the United States' most advanced and complex facility for nuclear weapons security. It doesn't look like much. What you can't see, is the super Walmart-sized facility buried under the ground. This facility is



fully operational and all the assets are now safe and secure and we are doing full production in this facility. This was another major security upgrade on the West Coast.

When Admiral Johnson was PEO Submarines he asked me to do two things to risk reduce the Columbia-class. One is to come up with

a concept called SWS Ashore. In typical PEO Submarines where I'm a sub to the PEO, he gave me a lot to start with.

This is what he gave me to start with. This is an original Polaris complex down at the Cape. That's what it looked like. He said, I need a facility that conceptually looks like this, and I need it pretty quick because we're going to do all the ship integration and test procedure, verification and validation, in this facility. So, get to work.

The concept with this facility is the left side, which is the side that's kind of in the darker orange or darker brown, is the Ohio side. You see the super structure complex on there. We'll do service unit ops on top of that. The far side, the right side in that picture, is the Ohio Replacement side where we'll put the first tube off the production run -- and I'll explain that in a moment -- with environmental chambers on the top and the bottom in order to certify and validate the missile heating and cooling complex. In the middle is where we'll put the missile control center module, which Electric Boat will use in the Ohio-class.

We built this facility so the roof can come off. We'll crane the MCCM, the MCC Module, in as that's completed. That's now in production at Electric Boat. This facility will be a shore facility for the

remainder of Ohio and into Columbia. That's the concept.

The first thing we had to do was drain the pits. They were literally filled with rainwater from years and years of non-use. We employed

some of the most extensive security processes that we could afford, given Admiral Johnson's budget that he gave me.

I have no idea how that critter got in there, but we stopped work until we got him out.

We then went to the recycle bin and we negotiated with Electric Boat. Many of you will recognize, this is WSSLBEF at Electric Boat cut in half. We put it on a barge and moved it down the East Coast, and then trucked it over here; two great Ohio-class missile tubes that in the program sense would have been foolish to throw away. We refurbished those, got a crane and put them in there. They fit just like they should, and we now have those two Ohio-class tubes in the left side of that complex.

Here you see hatch operations as well as those tubes refurbished inside that building. That side of the facility is certified for Ohio. That's the reality right there. So very much like the concept, and again, we're right on track there. In fact, this is the first missile tube coming out of BWXT being loaded.

That is the first Columbia-class/Ohio Replacement missile tube. That fixture has been delivered to Electric Boat. In fact, that tube is on

SWS Ashore, Cape Canaveral, FL

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the R-fixture being outfitted today. Again, it serves two purposes. One, it will immediately go down to the Cape as soon as it is done. More importantly, it is the tube second to the prototype, and sort of the demo tube that was on the R-fixture.

SWS Ashore, Cape Canaveral, FL

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This is the first missile tube that Electric Boat is using to verify and validate their process. So we're moving right along there. In fact, I was

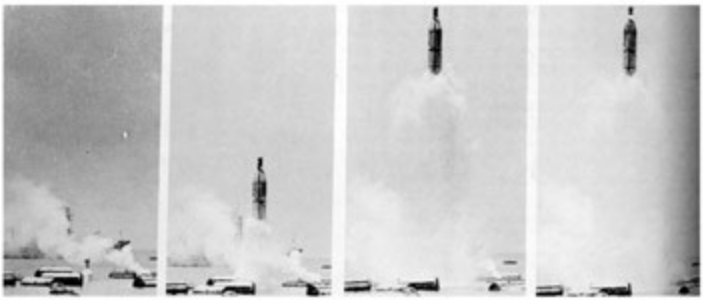
told this morning that Electric Boat has accepted the second missile tube at Quonset Point, and so we're moving forward.

I went back into the archives, 60 years this month, we used compressed air to prove that we could launch a missile out of a submarine tube, which is a pretty fascinating piece of history. That was done at the San Francisco Naval Shipyard. It no longer exists.

When we looked at reconstituting the launch tube capability for this program, that has been dormant for about 20 years. A lot of environmental changes in those 20 years. Materials, glues, adhesives - basically everything that we used in the original D5 design, is no longer available. We needed to look at how we could certify this, because we're going to do a production run of 240 launch tubes for both the U.S. and the United Kingdom, and we want to start with the right design moving forward.

We looked at reconstituting Hunters Point for an underwater launch capability. Again, it was cost prohibitive in my discussions with Admiral Johnson. So, we came up with another concept. We'd do it land-based, above ground and we would certify the design and get locked down for

Hunters Point Launch Facility



In November 1957, compressed air launching subsystem was proved by successful operation of Peashooter, an experimental tube launcher at San Francisco Naval Shipyard.

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production. So that's again the concept.

In typical Admiral Johnson's attitude, he gave me a lot to work with. That's what he gave me. He gave me a couple of acres out in the middle of nowhere in China Lake and said, get to work.

Launch Test Facility, NAWC China Lake, CA

CONCEPT

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So, we did. We built a big pit, put the foundation in, you can see that about mid-point into design we were filling the arrestment pit with gravel. I'll explain how this works here in a second. So, there's reality.

In the bottom left-hand corner, you will see the two shapes that look like missiles. Those are actually cement objects from the original D5 test series. We don't throw anything away in this program. We had those, we pulled them out and we refurbished them, and so we'll run this test program with those two cement shapes which are perfectly weighted and have the exact moments of a Trident II D5 missile.

The complex on the right is actually the launch tube complex. That top comes off. That top is on so that we can environmentally condition everything we need. Just prior to the test, we lift that top part off of the complex and we shoot.

This was the first shot. This is the shape actually leaving the tube. I'll give you kind of a still set here. You can see as we launched the first shape out, and it just falls into a gravel pit.

It's pretty simple from an engineering standpoint. A lot of you engineers may be asking, wait a minute, how are you going to do the underwater cross flow? We have an answer for that.

We will attach a cable to the nose of this device, and as the object is launched the cable will put the cross-flow vector on the moment. It's been tested. It works. We have actually shot seven tests. We have a very analytical process to go through and certify one, that our data matches the Hunter's Point, that our data matches what we are seeing at sea. Then we will move through and certify all the materials, the adhesives, the glues, the cross-flow capability, and then we will move into production on this.

(Video played).

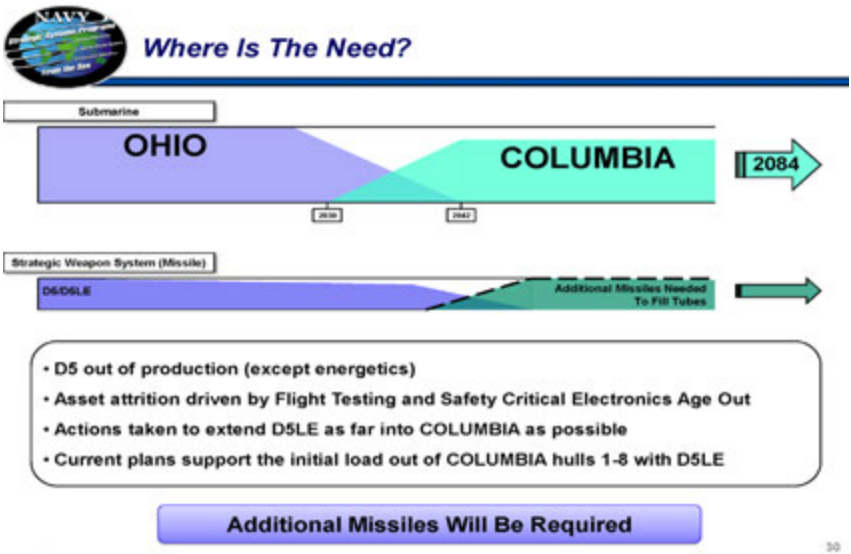
I'd just remind you, that's 140,000 pounds. It's about as simple as it gets.

But I think for every submariner in here, and for everybody who does this business, that drove home a very important point to me. When I look at my aspects and my accountability for this system, there are certain specific safety aspects which I will never violate. One of them is the requirements to ensure that at every moment I can guarantee we will have first stage ignition. That drives home to me, and I've used it with my engineers, why that firing chain, from the missile in the tube through first stage ignition and moving that 140,000 pounds away from the submarine and the men and women who are on that submarine, is absolutely paramount. If I take a missile, that missile is going to do exactly that,

except it's not going to land in the gravel pit, it's going to come back through the water right back at that submarine, which is unacceptable in anybody's mind, especially in mine as the director of SSP.

I'm using that as a training tool, in addition to doing what we're doing for getting ready for production.

That's what we're doing on life extension. That gets us through the Ohio-class submarines to that little triangle there that's created from the end of the Ohio and the beginning of the Columbia. That ensures my ability to honor my commitment that the Trident II D5 LE system will not only exist on Ohio through its life, but also be the initial out-load on the Columbia-class.



The second picture down there is the recognition that I am out of production on Trident. I do not have enough missiles -- we do not have enough missiles -- to get through 2084. So, there will be a need to follow-on to the Trident II D5 LE program.

So the first thing I needed to do, and I've spent the last couple of years working with DASN Ships), Mr. Stackley as the RDA and now Ms. Stiller as the acting RDA, to get fully aligned, agreement and documented, what is my acquisition approach and what is my acquisition

baseline update for moving forward? I have that, and I have that not only agreed to, I have that documented. So, we are off and moving in this approach.

I want to stress that this is notional. The acquisition approach that I have received approval to proceed on is a D5 LE2 capability. The reason I stress this is, go back to my comment, I am the only strategic asset in constant production for solid rocket motors. Those motors were designed with a 25-year life.

Through our surveillance program and through a lot of good engineering and block upgrades over time, we have now moved those motors out to approximately a 33-year life. We're not going to throw those away. That just doesn't make sense.

So the minute we say we're going to pull motors through, basically everything in the blue box has the opportunity to pull through. They're great designs. I'm no longer in production. I'll have to re-qualify, but why change something that works from an engineering standpoint, just like it should?

The yellow box is a recognition that we're going to make some material changes. I think everybody who has been associated with Trident

is amazed at the fact that the nose fairing is made of wood. We lift 140,000 pounds through that nose fairing structure made of wood, and we're not going to do that anymore, mostly because we're out of wood, not because that's a bad design.

The equipment section we will re-design specifically for cost. When we built the equipment section back in the late '70s, early '80s, graphite composite manufacturing was in its infantile state. We can do that in a much more efficient manner.

The equipment section will be the same size, it will just be a lot cheaper. The same with the inter-stage. So again, that drives us to the green box which is where the primary focus will be for the D5 LE system.

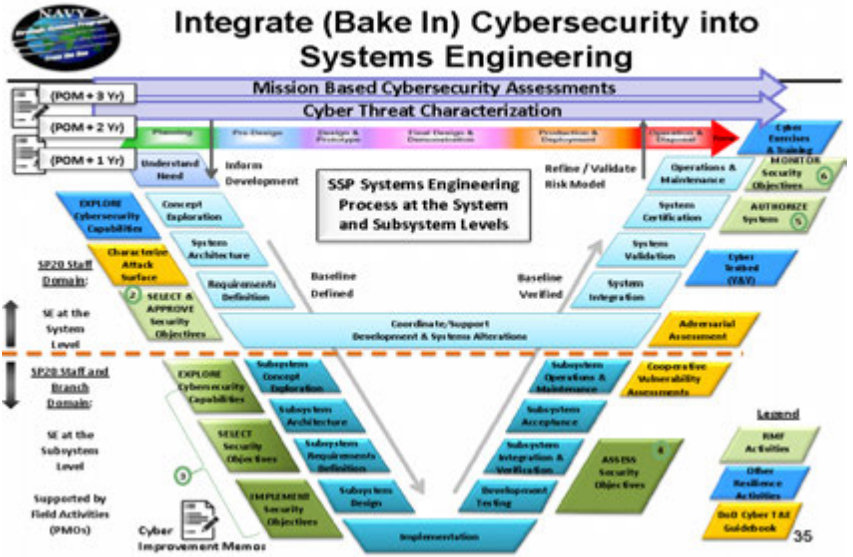
Avionics - we can do this missile with a lot less packages. We can do this missile with a potential avoidance of coming back to certify the missile in the facility if we change packages. Guidance we can do better.

Post-boost control system - today we have four gas generators which are in continuous burn during post-boost control system. The heat soak on the integrated bow assembly is huge. We had to use some very exotic materials back then. We think we can do that better, and then we'll move through the rest of the system. So, the focus will be on the green box.

We've set up working groups: acquisition and cost sub-working group; engineering and development integration, flight leads, shipboard leads, those are all stood up. We have been talking to OSD Policy, to the Joint Staff, to the Fleet, to STRATCOM on, what can you perceive being an additional requirement or an extension of the requirements that we could be forced or required to meet for LE2? And then ConOps, how can we produce and operate our strategic weapons facilities more efficiently, and how will we integrate this over time in order to minimize the A-subzero impact with the Fleet? All these working groups are stood up and starting.

We've gone through trade studies. We had 99 original R&D trades submitted. Every engineer wanted their area upgraded. It's cost-prohibitive, so we've come through a system which is, again, in accordance with the blue box, the yellow box, the green box, and the working groups will narrow that down. We've had discussions with N97 about what that looks like moving forward

But regardless of what we do, we will do it in the same systems engineering discipline that we have built the system to date, with one exception. We will integrate into our systems engineering process the requirement for cyber security moving forward to 2084. Not cyber security in the concept that most of us are focused on today, IT. We'll move it into a cyber security with regards to the weapons system. Those two things are different. I consider, as we should be, I think we're on the bleeding edge of cyber security concepts and innovative thought processes as we move forward within SSP. You should require that I am there, and you should not be surprised that we are working that very, very aggressively to ensure that this system is safe and always available to the leadership should it be necessary.



I've talked about where we're going. But I'd like to spend just the last couple of minutes -- this will be my last opportunity to address this group. I've been very privileged to do this for the last seven and a half years, and I just wanted to take a snapshot and represent the men and women, the military, the civilians and the contractors who deliver what I just said, and kind of give you a sense of the pace that we have been working at.

Since I took over as the director in May of '10, to today we've had 37 flight tests, 12 FCETs firing 27 missiles, six U.S. DASOs certifying six platforms back to the operational fleet, and eight missiles, and two UK DASOs, in support of the United Kingdom under the Polaris-Sales Agreement. We have had many, many opportunities from a security, and most importantly from a safety standpoint, to have an accident or an incident which would have negatively affected this program. We've moved 277 and 241 missiles to the Fleet, down to the wharf and back, and we have done the requisite number of service unit ops with the weapons in both SWFLANT and SWFPAC. Every one of those is an opportunity to have a bad day and negative effect. And again, the safety concept that we have embedded within the culture of this program, I think can't be evidenced any more than just looking at those numbers over that period of time.

That SSI program that I talked about, we've done 82 increment upgrades and never once have we been the reason why a boat has failed to sail as we've done SSI during this time. We've done 34 shore facilities to ensure that the crews are trained appropriately, and then 48. We have 18 more increments that we will do this fiscal year.

Production is just knocking it out of the park. We have delivered 110 IMUs to the new Mark VI Mod 1, and 132 EAs. As we've learned from all of our test flights on that, we've actually upgraded that number of requisite systems to tweak it prior to entering the CET phase.

Most importantly, we have supported 231 patrols for D5 to ensure that at all times the SWS has met its reliability, accuracy and availability numbers in support of the United States. Perhaps most importantly, we were the flight from Mars evidenced on the West Coast. This is DASO-26. For those of you who haven't seen this picture this was an amazing flight.

That flight was delayed due to range fouling. We actually shot just as the sun had gone over the horizon. That's actually off of San Diego, not off of San Francisco. We were in second stage burn and the apogee hit a point where the sun hit the plume from the second stage. That is the photo that was captured.

That was seen as far inland as Arizona and as far north as Oregon. It lit up the Internet.

(Laughter).

Yeah, there's some pretty amazing YouTube videos on that. So, it was a tremendous achievement on that flight.

Finally, I don't have a slide on it, but I am very proud to report that at 0300 on Monday night, SSP flew from Hawaii PMRF II to near Kwajalein, the first conventional prompt strike missile from the United States Navy in the form factor that would eventually, could eventually, be utilized if leadership chooses to do so in an Ohio-class tube (*Editors note: to clarify, from an Ohio-class SSGN (not SSBN) or Virginia-class VPM*). That's a monumental achievement, again, to the men and women that in addition to everything I just talked about that is being done on the strategic weapons side, that in parallel we have supported the OSD AT&L defense-wide account for technology demonstration. On our first go out of the box, a very successful flight of a conventional prompt strike maneuvering re-entry body. So, I'm very proud of that.

With that, ladies and gentlemen, it has been a real privilege to be here, not only today but for the last eight years, to be a part of this. I look out, I've been mentored and supported by many of you. I have grown tremendously in my interactions with industry partners sitting here. I

appreciate the opportunity and I am tremendously humbled to be the representative of the men and women of Strategic Systems Program.

Thank you very much.

NAVAL SUBMARINE LEAGUE
35TH ANNUAL SYMPOSIUM

UNITED STATES SUBMARINE FORCE: GETTING FASTER

MR. BRIAN HOWES
ACTING DIRECTOR, UNDERSEA WARFARE DIVISION
OPNAV N97

Thank you, Admiral, for the kind introduction. It's great to have an opportunity to speak here today at our annual gathering of the Dolphins. My intent this morning is to review and explain how we in the Undersea Warfare Division execute the collective vision that you've heard today, and distill it into our priorities consistent with the direction of our Secretary of Defense, Secretary of the Navy, the Chief of Naval Operations, Admiral Tofalo, Admiral Caldwell and the other leaders here today.

You've heard over these two days a consistent message of concern surrounding our fiscal environment. As a result of this continuing budget uncertainty and the suppressed resourcing levels in the Budget Control Act, it is very difficult for me to stand before you today as the Undersea Warfare Resource Sponsor and give you an update on a budget that I don't have, or a fiscal outlook that I cannot predict. I can tell you with certainty that the last eight years of continuing resolutions (CRs) and the Budget Control Act (BCA) have impacted our Navy in terms of training, ship maintenance, and modernization.

Admiral Tofalo already quoted our Secretary of Defense who says it much better. "No enemy has done more harm to the warfighting readiness of our military than sequestration." So given the uncertainty of our budget today, instead I will focus on our priorities and our warfighting requirements.

Before we start any discussion of priorities I'd like to ensure we're all on the same page in terms of guidance and direction. As you know, in the last year we've had a change of Administration and a resulting new Secretary of Defense and Secretary of the Navy. I would summarize the collective direction, including that from our CNO, to ensure today's force is ready and lethal; then focus any additional resources we have

on growing "quantity and quality" for "capability and capacity" of those "ready and lethal" forces. Of our forces, we prioritize a safe and secure nuclear deterrent and fielding a decisive conventional force. Finally, we must look for additional resources for growing our force first from within, through reform and better processes, before we ask for additional resources from Congress. So given that overarching guidance and in accordance with Admiral Tofalo's commander's intent, we "bin" this direction into two primary undersea warfare domains.

The first is Strategic deterrence; we've talked about it a lot. We've talked a lot about it for a reason. It is our number one priority. It is non-negotiable. It is fully funded, fully resourced and fully supported, for both today and tomorrow.

The next bin is what we call theater undersea warfare – said another way – to deliver effects within or from the undersea. As you know, this warfare area is not solely the domain of N97, however on the Navy Staff we are the advocate for Undersea Warfare requirements to make sure they are known and resourced appropriately to maximize our effects in both peace and war. We then translate these domain focus areas into discrete priorities. Again, these should not be new to you, but we'll review

those just so that we're all on the same page. We document these priorities in our "Integrated Undersea Future Investment Strategy" (IUFIS) which was started by Admiral Connor in 2011, and we refresh it and update it periodically. The strategy is our guide to meet our leaders' intent for both Strategic Deterrence and Theater Undersea Warfare.

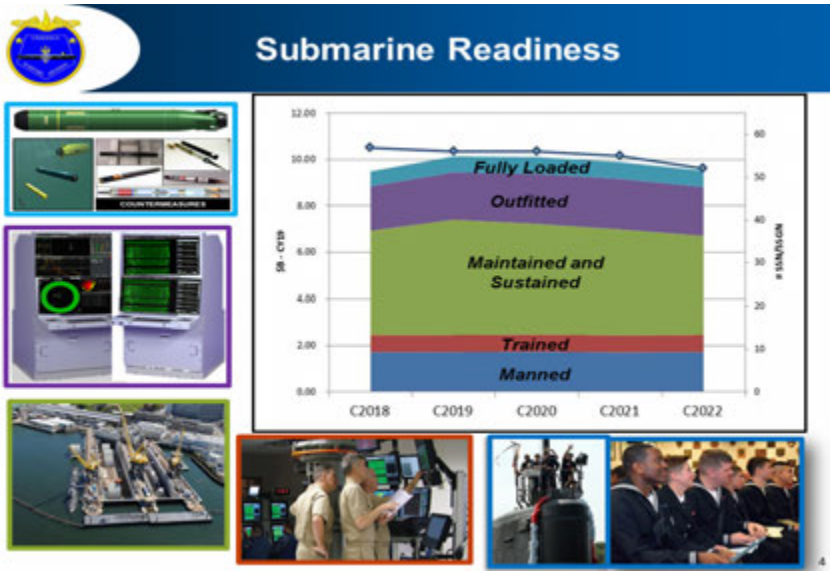
For Strategic Deterrence, as discussed, this is our Nation's Number One Priority; we must sustain the most survivable leg of our nuclear triad and ensure it remains credible and capable. Our priorities for Strategic Deterrence are simple. In order to be effective we must have reliable and capable ballistic missile submarines now and in the future, from OHIO through COLUMBIA. This submarine must be able to host and launch a reliable and effective ballistic missile at ranges sufficient to ensure we meet Presidential intent, while also ensuring our submarines can evade detection and execute their mission in their launch areas. Finally in order to be credible and capable, our submarines must be able to receive direction from our Commander in Chief with 100% reliability. This requires a redundant, resilient, and reliable command and control system.

For Theater Undersea Warfare, this is our ability to deliver effects within and from the undersea. Again, we have simple priorities. We must

ensure the forces we have are ready and lethal. First, we ensure our Submarine Force has sufficient force structure to deter, or if necessary, defeat the enemy from the undersea.

Next, we must ensure our Anti-Submarine Warfare Forces are capable of denying our enemies' submarines the same undersea advantage we currently enjoy and exploit. We will continue to exploit our undersea advantages to deliver payloads designed for use by our submarine skippers and by the operational commanders, what we call "lone wolf" and "pack" weapons. We have embraced unmanned systems as an undersea force multiplier, and we intend to accelerate their introduction into the fleet.

So given this view of our high-level priorities, I want to dive into a few more details on a number of them. The first is a review or a primer on our approach to Readiness. Readiness is obviously fundamental to both Strategic Deterrence and Theater Undersea Warfare.



Clearly the topic of Navy readiness has been in the news with the tragic events in the Western Pacific. As a member of the Navy Staff's Warfare Requirements Division under Admiral Merz, I can assure you our readiness challenges are front and center on his mind, as well as all

of our Division Directors. We take seriously our responsibility to support the Fleet through proper resourcing to ensure our ships, submarines, and aircraft and their Sailors and Marines are ready for both their peacetime and wartime missions year-round.

As a result, I want to review with you how we are working to address our Readiness challenges through the lens of the Submarine Force. I'm sure if I polled the people in this room as to what "Readiness" means, I would get many different answers. So, here is how we look at readiness from the OPNAV perspective and how we resource that Readiness.

What you see here is a basic graph showing our total number of attack and guided missile submarines over the next five years. Overlaid on this graph you will see the resources we have budgeted in order for Admiral Tofalo and Admiral Caudle to keep their ships ready.

To be ready our submarines must first of all be "Manned." For manpower folks that means we must have a "body" for every "billet" and every one of these bodies must be appropriately trained and have the required skills.

Next, these crews must be "Trained" through an effective training pipeline with modern training systems to provide initial skills and team training for our new Sailors. We must also have effective training systems to ensure our submarine crews sustain and improve their combat expertise as both teams and in individual skill areas.

Then, our submarines must be "Maintained and Sustained." Admiral Tofalo has already discussed this. This is what we call our intermediate and our depot-level maintenance, our maintenance when our ships are in homeport and the maintenance conducted in our public shipyards. As we discussed, over the last five years or more, we have suffered from a mismatch between the work we need to do and the work we funded, what we call the workforce mismatch. This mismatch was the result of a number of factors, pressures to absorb the budget cuts inflicted by the Budget Control Act being the primary driver.

Recognizing this mismatch, we are committed to fixing both sides of the equation. The Fleet and NAVSEA are improving their scheduling and their maintenance planning process to ensure we fully capture the workload. On the workforce side of the equation, the Navy increased our investments in Readiness in the Fiscal Year 2017 base budget and

supplemental, and requested $3.4 billion more in Fiscal Year 2018.

For our carriers and submarines, that investment is going to increase our civilian workforce at our four public shipyards. We've also used temporary measures to rebalance our workload by contracting with our two private nuclear shipyards to conduct four submarine overhauls, most recently USS *Boise*. These efforts will take time to fully take effect, however the benefit will come from increased operational availability for our attack submarines.

As you know, we prioritize our ballistic missile submarine and our carrier maintenance in our shipyards so our attack submarines have suffered delays over the last five or more years. When it comes to these maintenance delays, I'll state the obvious -- A submarine stuck in a shipyard is not available for combat. We intend to fix that problem.

Next, our boats must be "Outfitted." This means that all of our boats must receive modern combat systems and sensors so that even our oldest submarines are as combat capable as our newest.

Finally, our ships need to be "Fully loaded." In simple terms, every tube, every stow, every magazine, needs to be full. This is an additional focus area for us, in addition to submarine maintenance, as we increase the quantity and quality of what we put in our submarine magazines.

So to review this whole illustration, when you look at Readiness from this perspective, a number of key points should emerge. These readiness funding requirements are scalable to our force structure and they are enduring. Our notional readiness cost is about $180 million per boat per year. When we buy future submarines above our current force levels, we have to account for these per boat total ownership costs or our boats won't be ready in the future. You might be able to take divots out of some of these layers for a year or so to pay for emerging bills, but if you do so over time our ships won't be ready.

In the past there was the desire to sacrifice readiness investment to pay for new ships and submarines. That's a false choice; we need them both. We must ensure that our force today is ready and then build from there.

Finally, when we're talking about Readiness we need to have no confusion. Our ships and our submarines are ready to confront any adversary at any time. These investments are only meant to strengthen our

force.

Now that we've discussed Readiness, we'll briefly discuss strategic deterrence. For today's force our center of gravity is the OHIO Class SSBN and the D5 Trident weapons system. For the future that center will shift to the COLUMBIA SSBN and the Life Extended D5 missile system. Our focus is ensuring we have a seamless transition between today and tomorrow.

In order to ensure this seamless transition, both the submarine and the missile and their associated systems must be maintained and modernized. We've already discussed the need to maintain our submarines. For our OHIO class our emphasis is on maintaining or improving each ship's material condition so it reaches its expected service life of 42 years. Captain Scott Pappano is responsible to make sure that we can achieve that.

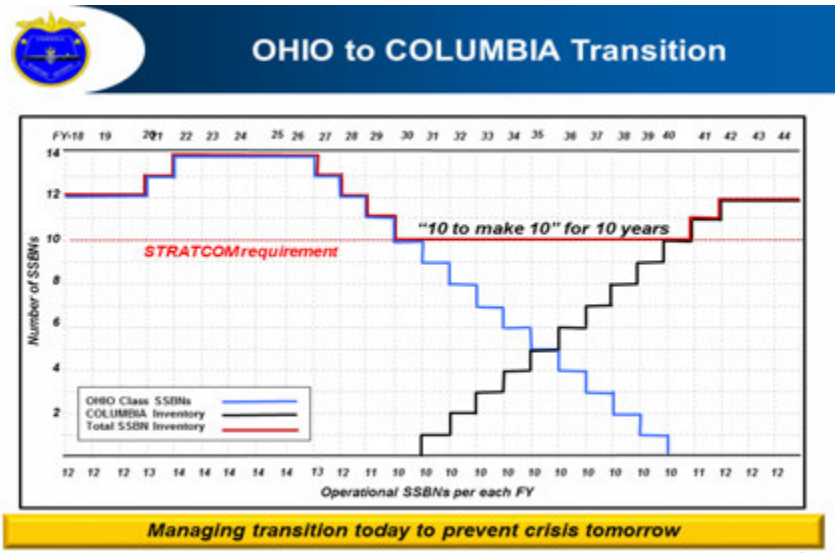
As we have no margin for the delivery of the COLUMBIA-class, if the ship doesn't make it, there will be a gap in our operational commitment to United States Strategic Command. As Admiral Tofalo stated, critical to meeting our requirements is keeping our ships at sea by doing efficient and effective maintenance. There are two elements of that maintenance: 27 month refueling overhauls – and we have four more ships to complete; and 35 day refit periods in order to maintain the operational availability of our ships at sea.

In addition to the submarine mechanical systems, as we do with all of our submarines, we modernize our SSBN electronic systems to employ the latest cutting edge sensors and systems to outpace our adversaries. We are converting our SSBNs to the SWFTS [Submarine Warfare Federated Tactical Systems] model. Our submarine combat systems that we use on our SSNs; all of our OHIO-class submarines will have SWFTS, and the COLUMBIA will have it built in.

Vice Admiral Benedict just completed a great discussion on the Trident D5, what he has done, and where he is headed. The fact that we can take a D5 missile that was developed in the 1970s and 1980s and extend it through 2084 is an incredible testament to the credibility, reliability and capability of that weapon. We're all in.

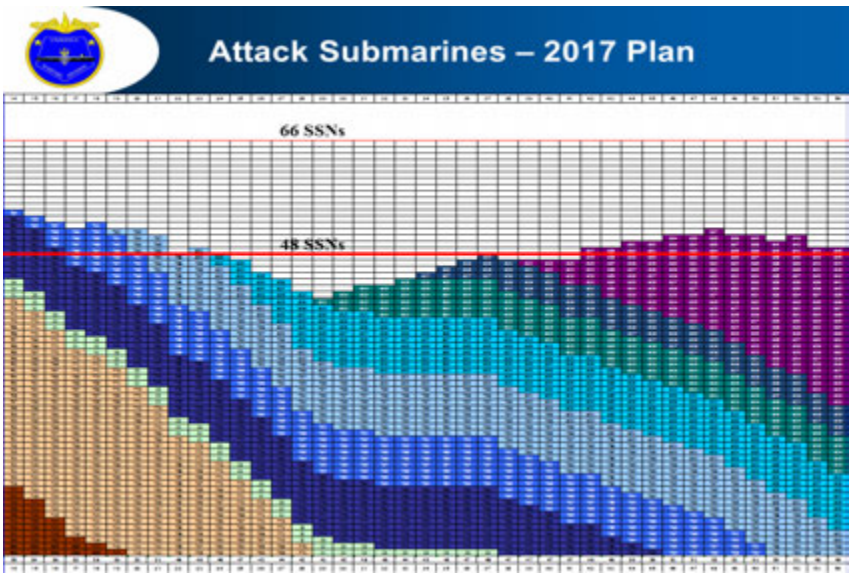
This graph illustrates the biggest future challenge the Navy faces in supporting our mission of Strategic Deterrence. This shows our transition from the OHIO-class to our COLUMBIA-class submarine while continuing to meet our Strategic Deterrent force requirements to United States Strategic Command, which is 10 operational ships. It shows us completing our OHIO refueling overhauls and then the delivery and certification timeline for COLUMBIA submarines as they come online and the first COLUMBIA goes on its first patrol in October of 2030.

While the COLUMBIA design and construction is front and center,



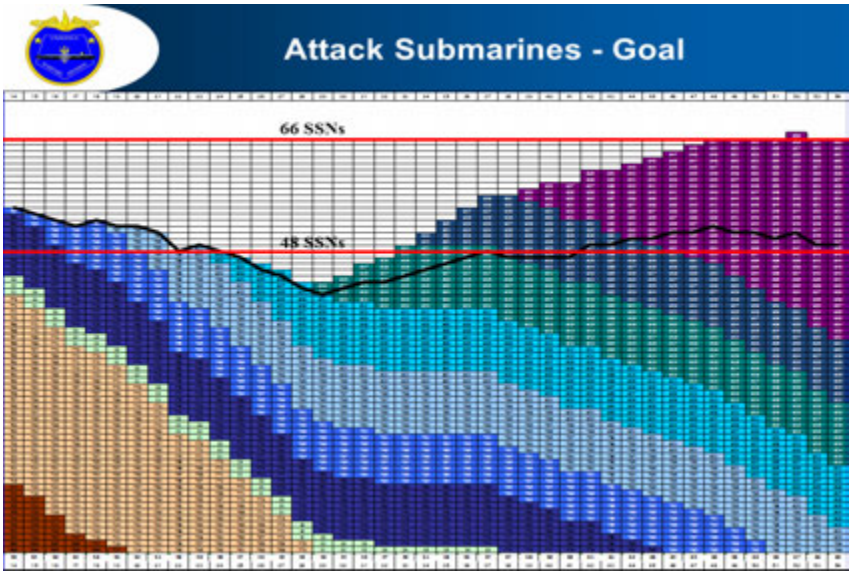
appropriately in everyone's mind, we are also working the supporting requirements for manning ashore and assigned to our new SSBNs, our training and ship repair facility infrastructure, and our home-porting transition plans. All are part of the puzzle to make sure that we can meet this minimum, non-negotiable requirement. This transition is fully executable. We recognize there are many moving parts that we must get right today in terms of planning and resourcing, and we are, again, fully funded to ensure there is no gap.

Shifting now to the theater undersea warfare mission, as you know one of our priorities for Undersea Warfare is ensuring we have sufficient forces to meet our Combatant Commander needs, both in peace and war. A key element of those forces is our attack submarine force. For over a decade our force structure objective was 48 attack submarines. In the last year, as part of the Navy's analysis of the new force structure requirements and given the changing international environment, our new objective is now 66 submarines within the 355 ship Navy.



This graph shows you our force structure as projected by the Fiscal Year 2017 shipbuilding plan against a 48 attack submarine requirement. The next illustration shows you what a minimum 2 per year SSN build

profile would do to achieve a 66 attack submarine force structure requirement. This minimum two per year profile gets us to our peacetime and wartime force structure objective and also gives an enduring signal to our industrial base, allows for stable programming and budgeting for our shipbuilding accounts, and gives us a stable assembly line or conveyor belt which allows us to continually improve our attack submarines over time. In line with SECNAV and CNO direction, this notional profile is a minimum foundation from which we will pursue additional measures to achieve our force structure requirement sooner.

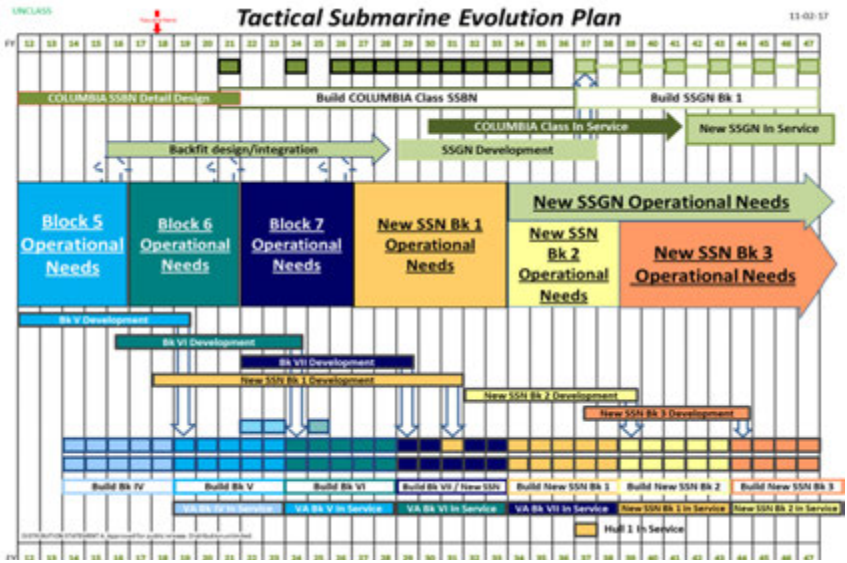


In terms of our attack submarine design, the VIRGINIA-class is a highly capable platform, the best in the world, originally designed for littoral operations, but not necessarily designed for today's international environment of emerging competition. As a result, the VIRGINIA-class is evolving. Block III introduced the VIRGINIA payload tubes. Block 5 will have the VIRGINIA Payload Module and other additional capabilities.

However, we are running out of design margin in this great platform, and there are some Fleet needs which this platform cannot meet. As a result, under Vice Admiral Merz' leadership, we've started the discussion

about how we are going to leverage our block improvement conveyor belt to wring out as much as we can from future blocks of VIRGINIA while setting us up for success after VIRGINIA and COLUMBIA. This effort is what we call the Tactical Submarine Evolution Plan, or "TSEP," which is our approach to continue to improve our platforms whether on the VIRGINIA or the next generation submarine.

This is a very notional outline of TSEP. We've taken a lot of the details out because they're classified and they need to be, of the capabilities that we are going to demand our shipbuilder inject into this platform. If it can't be injected into this platform, we're going to design a new one.

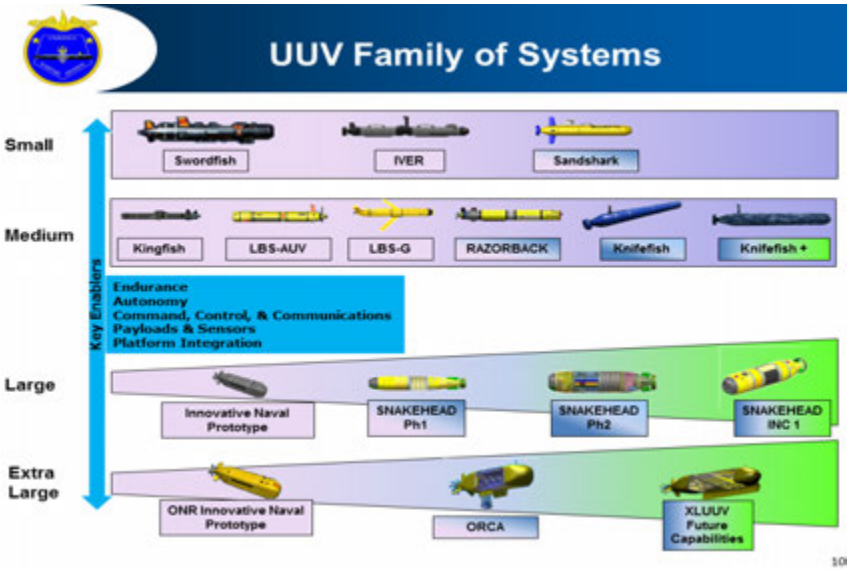


We need to maintain flexibility as we execute our "block purchase" for Economic Order Quantity (EOQ). For instance, Block 5 has a block of five years resulting in 10 boats. The Block 5 starts in FY '19. If we determine in 2019 we need to incorporate a new capability into that submarine, we shouldn't wait five years. We need to inject that new capability as soon as possible, so we need to have the opportunity to have mid-block insertions into our platform. Captain Stevens talked about that yesterday.

Our TSEP process also keeps a running tally of these future fleet

requested capabilities, which gives us a steady demand signal for technology development to industry and our R&D community. It gives us a ready menu of mature and maturing technology that we will insert when ready. This approach is much like what we do with our SWFTS program and our combat systems, but applied on a much larger, platform-level scale. So we're now moving beyond the discussion phase into the action phase with submarine force leadership, NAVSEA and the OPNAV staff to execute this plan. We'll continue to provide details on this effort to our industry partners in the appropriate classified venues.

One of our final investment priorities is accelerating delivery of unmanned systems into the Fleet. What you see here is a simple illustration of a UUV family of systems. It follows the framework of the Navy's report to Congress in February of 2016 titled, "Autonomous Undersea Vehicle Requirements for 2025."



We divide our vehicles into four classes based on size: Small or Man-Portable; Medium, which are less than 21 inches in diameter; Large, 21 to 84 inches in diameter, which aligns with the dry deck shelter and the VIRGINIA Payload Tube diameter; and Extra-Large vehicles, which are larger than 84 inches. These classes can be employed by a variety of

platforms and perform a variety of mission tasks, including environmental sensing, mine warfare, and Far Forward missions where our submarines operate. These vehicles share common technology requirements, including sensors, endurance, autonomy, and command and control.

From this perspective, you can see there is a synergy across the vehicles, mission tasks and technology. Given that synergy, we have consolidated many of these efforts into a single Resource and Requirements Sponsor under N97 and the lead program office, NAVSEA PMS406, and established lead-follow relationships with the other supporting resource sponsors and program offices so we can pool our resources and pool our efforts to get our unmanned systems to the Fleet faster. When N97, OPNAV staff, and the acquisition teams briefed the CNO on our unmanned systems vision in his office, he directed that we accelerate all of our unmanned systems in order to deliver to the Fleet as soon as possible. That meeting also provided the direction to consolidate vehicles under N97 to support that effort.

Yes, N95 vehicles are coming to N97, the mine warfare and naval special warfare vehicles. Sydney, you asked a question, what are we doing about working or testing or demonstrating these capabilities? Admiral Tofalo mentioned we stood up UUV Squadron 1 last month. That is the incubator for our Far Forward experimentation and demonstration. They have vehicles today. We're going to get the vehicles as fast as we can so they can start experimenting, demonstrating, and establishing future requirements in terms of individual vehicles, vehicle-to-platform, and vehicle-to-vehicle.

There are also other incubators in the EOD community and the special warfare community. We intend to leverage all of them. We are also leveraging industry work, as evidenced by the exhibits on the other floor, what we're doing with UUVs, as well as our ONR and DARPA partners. So we look forward to providing you updates on our progress at future conferences.

As the theme of this symposium is "Getting Faster," I want to end my remarks with some perspective on our collective efforts to do just that. In 1945 Commander Gene Fluckey volunteered to install a rocket launcher typically used on amphibious ships for shore bombardment on his submarine, USS *Barb*, while in a shipyard period in Mare Island Na-

val Shipyard. On his next war patrol he launched 68 rockets, bombarding the Japanese mainland. From this innovative request, to putting ordnance on target, was a span of less than four months.

In 1955 the Chief of Naval Operations, Arleigh Burke, directed the Navy to pursue launching a ballistic missile from a nuclear submarine, the first of which, USS *Nautilus*, had just gone to sea. In 1960 USS *George Washington* launched the first submarine-launched ballistic missile, five years from concept to launch, including just 14 months to modify the submarine to add a missile compartment.

Fast forward to the 1990s and we were challenged by Submarine Force leadership to regain our acoustic advantage by leveraging the commercial computer industry. Acoustic Rapid COTS (Commercial-off-the-Shelf) Insertion (ARCI) was born, informed by experimentation and demonstration, and software insertion continues. That pace of rapid technology and software insertion continues to this day.

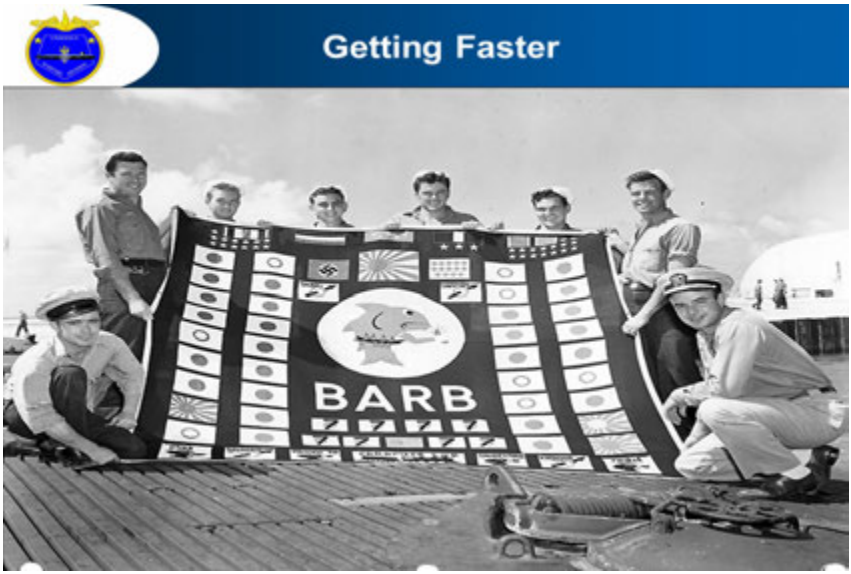
Fast forward again and we see the rapid demonstration of unmanned air and unmanned undersea vehicles from submarines, from concept to demonstration in years, not decades. Again, these vehicles are now formal programs. Admiral Tofalo's Undersea Rapid Capabilities Initiative is the engine driving undersea innovation today, and we at N97 fully support those efforts.

This brings us back to *Barb*. Four months from concept to combat. We cannot be that fast today, but we need to. While we have examples of going faster and fostering innovation, we aren't going fast enough or far enough. The CNO continues to challenge us to get faster. Our competition is catching up, and that's unacceptable. We have to break free from our comfort zone and go faster with our major programs through accelerated acquisition efforts, through developing new payloads, systems and sensors, and through rapid prototyping and demonstration efforts.

Before the meeting this morning I had a discussion with a friend from industry. He said, "what should be some of those examples and what should we be mutually confronting?" As a start, I'd say contracting, test and evaluation cumbersome requirements, taking risks in prototyping and demonstration, putting things on submarines faster, like Tom Nutter used to do with his famous "Nutter Clutter." We need to be able to embrace that risk and get them on our ships faster, and then accelerate

those into Programs of Record.

We talked about the CNO's charge to us for UUVs. We are finding and flattening every impediment for the acceleration of our UUVs into the fleet, many of which were on that list I just talked about, and reporting those efforts to the CNO for his assistance when required. To go faster takes changes in how we design, how we contract and what risks we accept. On the Navy Staff we are challenging the status quo and pushing to meet the CNO's challenge and support our future "Gene Fluckeys" and the crew of the next USS *Barb*.



Finally, I'll leave you with a few closing points from the Undersea Warfare perspective. First, we are committed to strengthening our Fleet's readiness. Second, we are fully committed to our Strategic Deterrence responsibilities from cradle to grave. We are focused on sustaining and improving the most lethal undersea conventional force on this planet. In this period of renewed political competition, we must go faster to stay ahead in order to strengthen deterrence and ensure victory. We will do so by removing impediments to innovation and incentivizing cost reductions in our programs so we can reinvest those savings to buy more lethality. Finally, we cannot buy the Navy the nation needs through inter-

nal reform alone. We need relief from the Budget Control Act.

Thank you, again, to the Naval Submarine League for your continued support for our Navy and our Submarine Force and the opportunity to address this symposium. I welcome your questions.

NAVAL SUBMARINE LEAGUE
35TH ANNUAL SYMPOSIUM

UNITED STATES SUBMARINE FORCE: GETTING FASTER

REAR ADMIRAL DARYL CAUDLE, USN
COMMANDER SUBMARINE FORCES, U.S. PACIFIC FLEET

Aloha. I'll tell you what, the only thing that's slightly better than being the first speaker after lunch is being the last speaker before a break. It's big shoes to follow VADM Terry Benedict. What an incredible subject matter expert. I'm just sitting there in awe, no notes, just rattling this stuff off. It's extraordinary.

As the admiral said, I just came from Naples. I was over there talking to some folks last night about how it used to be this 60/40 split with 60 percent of the force in the Atlantic and 40 in the Pacific. I talked to Admiral Tofalo in that job and was thinking, why don't we have it that way now? I need all this force to go against the things that I'm trying to do over here in the EUCOM theater. Then they sent me over here to the Pacific, and now I'm trying to negotiate an 80/20 and will settle for a 70/30 split.

(Laughter).

But good morning and aloha from beautiful Pearl Harbor. While it's always a shame to leave sunny Hawaii. it is great to be back in D.C. and an honor to speak in front of such a distinguished audience. Thank you to the Naval Submarine League and all you do to promote our submarine force and its contributions to our national security.

Events like this symposium and numerous local events across the country allow us all to stay engaged with today's submarine force, educate the public, tell our story, and generate much needed support and understanding of our vital and special mission. I'll echo my colleagues in congratulating Rear Admiral Padgett on his selfless service to the Naval Submarine League. He's certainly a leader that knows all too well what a great job I have and how much fun it is to command in the Pacific.

Today I want to talk to you a little bit about our nation's submarines, in line with this symposium's theme of how we're getting faster. In the

Pacific we see our competitors in the undersea domain getting faster and more capable and more integrated each and every day. We're making advances in all aspects of submarining, as you've heard, from so many of the speakers already, advances in design, in training and in our relationships with partners and allies. We're continuously improving our processes, focused on operations, and continue to adapt and innovate at every level to ensure we keep up with the changing strategic landscape. We're doing this to remain the world's pre-eminent maritime power, well ahead of our adversaries in the undersea domain.

So first I'd like to provide some context about what our adversaries are doing around the world. You can understand why it's so important that we continue to invest in and develop the warfighting capabilities of our submarine force. I will then explain how we're implementing our strategy to be the best in the world, getting better and faster in every theater of operation filled with threats that show no signs of slowing down.

So why is it so important to ensure that our submarine force is getting faster? Because our oceans have become one of the most contested regions in the world. In order to promote our national interests and protect our sea lines of communication, we must continue to adapt and develop our capabilities to ensure we remain the dominant undersea force. It is easy to see, based on the events over the past year, that our adversaries continue building their capabilities to thwart our regional influence, which challenges our ability to deliver strike forces at the time and place of our choosing.

The Russian navy has returned to operational tempos we haven't seen since the Cold War in both the Pacific and the Atlantic. From open Defense Intelligence Agency reports, they have demonstrated advanced warfighting capabilities through land attack cruise missile launches in the Eastern Mediterranean, and the second deployment of the Severodvinsk SSGN, one of the world's most quiet and capable submarines. I have no doubt that the Russians want to bring these same capabilities to the Pacific fleet.

China continues its aggressive expansion of its capabilities. For instance, in a state-run China Ocean News article, China reported its plans for a large underwater monitoring system designed to detect foreign ship movements and reduce the stealth advantage of our submarines. Their

operations have continued to become more sophisticated, with longer, more frequent deployments, including sustained operations in the Indian Ocean.

North Korea remains an ever-present threat with its relentless and provocative nuclear tests. North Korea continues to pursue a submarine launched ballistic missile and development of the GORAE submarine as the launch platform. The proliferation of Russian and Chinese diesel submarines continues to grow as Vietnam and Bangladesh order Kilo-class submarines, adding to the undersea congestion and the waterspace management challenges.

We continue to see new players in the undersea spectrum, including the possibility of India acquiring a second Russian AKULA SSN. In total, 12 countries now operate submarines in the Pacific AOR. These events just touch the surface of what has become an incredibly complex and challenging area of operations for our undersea forces, with wide-reaching asymmetric and asynchronous consequences. So, let's review some of these challenges a bit more in detail.

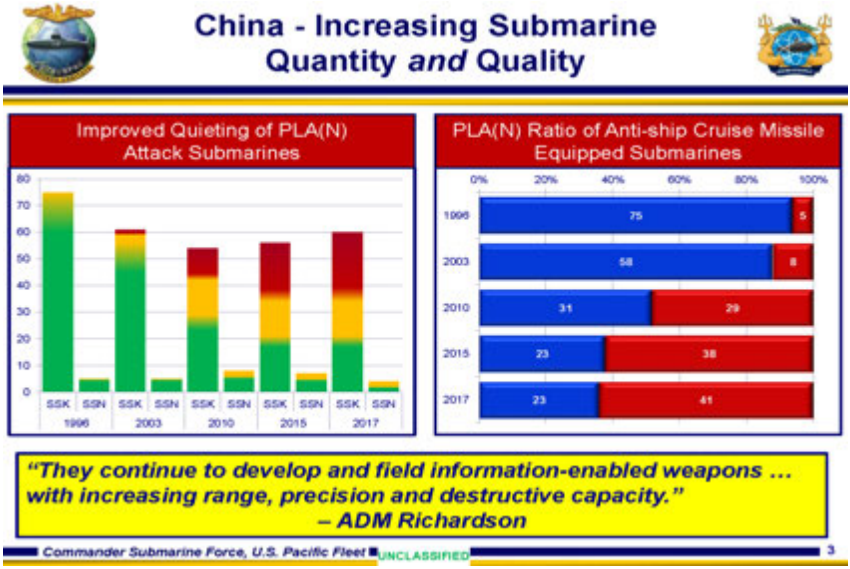
First, let's talk China. China has invested heavily in not only the number of attack submarines it possesses, but also improving their tactical capability and operational integration as a maritime force.

The chart on the left shows the number and type of attack submarines in the Chinese navy. It is a submarine force coupled with a relative quieting ability, with green being the noisiest and red being the quietest. The green represents their initial ship classes: the ROMEO-class, the MING-class, and the nuclear-powered HAN and SHANG-classes. The yellow represents diesel-electric SONG-class and the improved nuclear SHANG-class. The red indicates the newer KILOs and YUAN-class, the quietest submarines in the Chinese order of battle.

China is making the development of quieter submarines a priority that will create additional challenges to our maritime forces operating in the region. China has also demonstrated that it wants to equip its submarines with a strong offensive capability. The chart to the right indicates the percentage of Chinese submarines that are equipped with anti-ship cruise missiles. These missiles have the improved ability to threaten our surface ships from even greater distances.

According to a 2015 Department of Defense report to Congress, "the

PLA navy recognizes that long range anti-ship cruise missiles require a robust over the horizon targeting capability to realize their full potential. China has, therefore, invested heavily in reconnaissance, surveillance, command and control, and communications systems at the strategic, campaign, and tactical levels to provide high-fidelity targeting information to surface and subsurface launch platforms." Not seen on this slide are the Chinese ballistic missile submarines, the JIN class. So far, five JIN-class submarines have been launched, each with a capability to carry 12 or 16 ballistic missiles. The JIN-class provides China with a survivable second-strike capability, enhancing their strategic deterrence capability and effectiveness.



China has also significantly expanded the scope of its submarine operations. They have demonstrated great improvements in submarine endurance, conducting extended submarine deployments to the Indian Ocean every year since 2014. These multi-month deployments are occurring where China is also routinely conducting coordinated surface force operations near their first overseas base in Djibouti. They are expanding their influence throughout the region with ship visits, port investments, and military sales.

China is establishing a "Maritime Silk Road," or as some have called it, a "String of Pearls," through their "Belt and Road Initiative," a maritime trade and transportation route reaching from the South China Sea and Indian Ocean to the Eastern Mediterranean, encompassing South and Southeast Asia, East Africa, and Near and Middle East, according to the Center for Strategic and International Studies.

China is clearly committed to exploiting the advantages of the undersea environment. I already spoke about the commitment to the sea-based strategic asset with the JIN-class submarine, but these new types of operations, specifically the far seas patrols, will stress our theater anti-submarine warfare and maritime security efforts. In addition, in the Congressional report on China's modernization efforts, O'Rourke noted that future PRC forces will be land attack cruise missile capable, bringing an additional first strike threat to the regions with clandestine long-range precision guided munitions that we must contend with in coordination with our allies and partners.

Let's shift to the threat that so many in this room spent their careers encountering, Russia. Recent events in the Ukraine and Syria demonstrate that the Russians have continued to develop advanced warfighting capabilities. The Russian navy, specifically its submarine force, is also

expanding its operations. As their submarine force continues to be modernized, we assess that the pace, scope and duration of their operations will increase as well.

The Russian military budget has doubled in the last decade. Their Navy's goal is to rebuild their blue-water presence with their current shipbuilding priorities being based on modern nuclear submarines. Simply said, nuclear submarines are their capital ships.

This shipbuilding and modernization strategy is designed to better enable Russia to defend its vast territory and national interests. Russia has demonstrated a new warfighting capability with its KALIBR missile. The KALIBR missile can be launched from submarines or surface ships and is built in land-attack and anti-ship variants, with reported ranges between 200 and 1,500 nautical miles according to a report by the Center for Strategic and International Studies. Russia's payload-over-platform strategy enables the KALIBR to be launched from nearly every ship in their Navy.

Until 2015, only the United States and the United Kingdom had used land-attack cruise missiles in combat operations. Russia joined this elite group of nations with its launches into Syria in 2015.

While Russian submarine totals remain relatively constant, operational availability in the Pacific will go up as they continue to transfer forces, according to open reports from the Defense Intelligence Agency, specifically two of their DOLGORUKIY-class SSBN submarines, and eventually their highly capable SEVERODVINSK SSGNs to their Pacific fleet.

As stated earlier, North Korea continues its provocative actions with numerous nuclear tests and missile developments. North Korean leader Kim Jong-Un reported, through his state media, that he remains committed to "…establishing the equilibrium of real force with the United States," through efforts to miniaturize the country's nuclear weapons with the goal of developing a reliable way to deliver these weapons with greater ranges. In August of 2016 North Korea successfully test launched a KN-11 submarine launched ballistic missile from a GORAE submarine. Based on a U.S. Strategic Command press release, this missile flew about 300 miles, entering Japan's air defense identification zone just before splashing down in the Pacific Ocean.

While dependent on the operational range of the launch platform-

submarine, the Center for Strategic and International Studies estimates the KN-11's maximum range to be nearly 1,100 nautical miles, which would allow North Korea to strike targets easily in South Korea and Japan. Due to the obsolescence of North Korea's conventional military capabilities, the country has moved to a strategy based on weapons of mass destruction, an asymmetric capability including cyber-warfare. This strategy will create more uncertainty and instability in the region that will require our naval forces to be ready for an even larger number of possible contingencies.

In general, the continued, rapid development of naval capabilities by nations throughout the Indo-Pacific region has created many potential friction points that we must understand and address. During the 2016 Maritime Security Challenges Conference, Admiral Swift said, "As a rule, when nations apply sea power professionally and responsibly, it broadens national and regional prosperity alike. When seapower is applied provocatively and opportunistically, friction results with great potential for spiraling instability."

The tracks on this chart show aggregated shipping density from Automatic Identification System data. Over half of the global shipping totals pass through the Indo-Pacific region. The Strait of Malacca alone handles 25 percent of all traded goods and 25 percent of all oil shipped globally.

The South China Sea is now one of the most congested areas on the planet. China, Vietnam, the Philippines, Taiwan, Malaysia have occupied 71 outposts in the Spratley Islands. Brunei also claims a portion of the archipelago but has no occupied outposts.

PRC outpost development in the Spratleys has increased significantly in recent years according to open source reports from the Office of Naval Intelligence and the 2016 annual Report to Congress from the Department of Defense. The PRC occupied seven outposts in 2014, but today has created or "reclaimed" more than 3,000 acres of land in the Spratley Islands, including the creation of several strategic outposts, while building up their military infrastructure and sustained presence on these outposts. Make no mistake that the "infrastructure" they're building consists of runways, communication and surveillance systems, and barracks to support revolving deployed forces, according to a 2016

China Military Power report by the Department of Defense. This constitutes a contested Chinese military expansion into a body of water that plays host to $5.3 trillion of world trade each year and includes territorial claims by six countries.

Increased Chinese involvement in African and Middle Eastern affairs will lead to continued Chinese naval operations in the Indian Ocean, which will likely increase tensions between India and China as their forces operate in close proximity more frequently. Throughout the Pacific there are more nations putting naval forces to sea more frequently in heavily trafficked areas where there are competing interests and territorial claims. Miscalculation could rapidly create a flashpoint and military conflict. Our submarine force has to operate successfully in this challenging environment every day and be ready to respond immediately and decisively in any conflict.

So how is our Navy team getting ready for this ever-present and complex threat of armed conflict? It starts with robust planning and prioritization efforts. Specifically, we're planning to maximize flexibility. The 3rd and 7th Fleets were established March 15, 1943 to execute combat operations in the Western Pacific. Until 2015 3rd Fleet predominant-

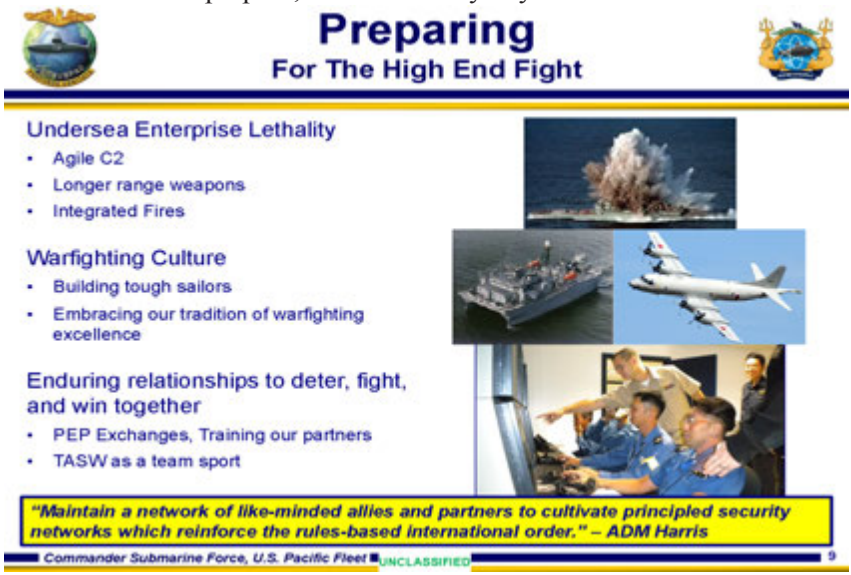
ly played a force generation role to provide forces to 7th Fleet, but today that has changed.

In 2015 Admiral Swift, the Pacific Fleet commander, established a wider role for 3rd Fleet when he announced 3rd Fleet Forward, making the administrative boundary at the International Date Line that traditionally separated 3rd and 7th Fleet, essentially transparent. The goal here, in line with planning for the high-end, full spectrum fight, was to enable flexibility to our Command and Control structure and to increase our operational, decision-making capacity. The Pacific submarine force has always been at the leading edge of this fleet-wide effort to get Command and Control right, without regard to arbitrary lines on a chart. Through exercises and real-world operations, COMSUBPAC routinely and seamlessly provides ready forces and acts as the operational commander, theater-wide in close coordination with my 7th Fleet counterparts.

Our submarine force continues to adapt its operations to overcome Command and Control challenges that have arisen from recent improvements in our adversaries' technical capabilities. Specifically, the ability to conduct sustained attacks on our cyber and networked systems, as well as degrade or deny our navigation and communication signals, has

the potential to significantly disrupt maritime operations. Despite these challenges we continue to plan and develop counter capabilities across the DOTMLPF so that our submarines can accomplish their missions, regardless of the environmental conditions.

Our success in the high-end fight depends not only on how we plan, but also how we prepare, each and every day. In the Pacific Submarine



Force, I'm pursuing a strategy that reinforces and improves the lethality of our undersea enterprise. By the way, I'll just pause here for a second just to say that Admiral Fluckey was a "bad-ass." Stay with me.

Our warfighting design will allow us to rapidly and successfully respond to any conflict. Our new weapons will enable us to be lethal from even greater distances. Technological advances in our combat systems will make our weapons more cost efficient, while improving our performance as an integrated element within the joint forces kill chain. Our submarine force is embracing and renewing a warfighting culture of toughness in everything we do. We are framing our missions, our exercises, and our competency development efforts in the context of warfighting in order to give our sailors and officers the proper context, perspective, a strong sense of ownership, and a clear vision that focuses the

energy we apply every day to personnel and material readiness.

We are also building enduring and trustworthy relationships with our allies so that we can deter, defend and win together. We have shown our commitment to our allies through personnel exchange programs, information sharing, and joint Theater anti-submarine warfare operations, reinforcing the concept that submarine operations are a team sport. These specific partnerships are crucial to maintaining our shared prosperity and mutual defense.

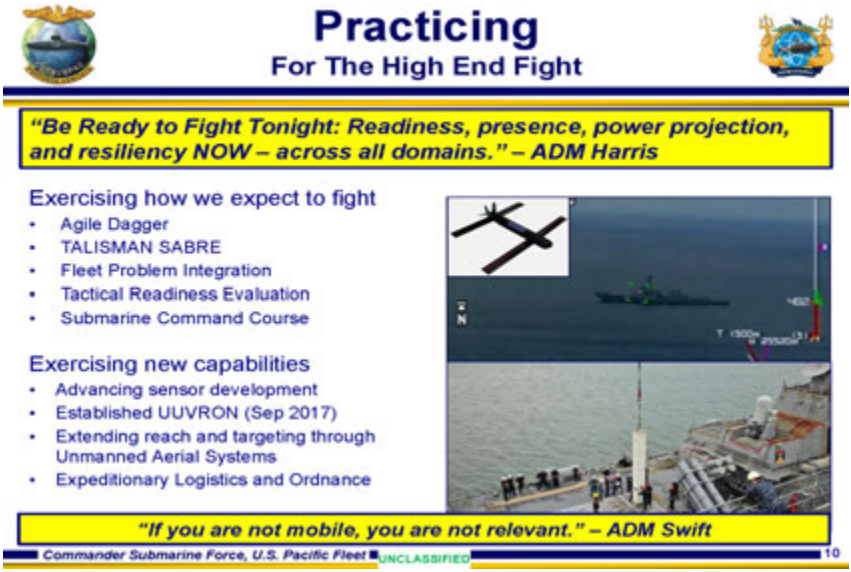
Like any great sports team, the submarine force knows the importance of practice. And our practice is expertly tailored to ensure the success of our forces in the Pacific against the many threats I've described. Numerous exercises such as TALISMAN SABRE and Carrier Strike Group Fleet Problems are stressing the submarine's role in combat, further defining our place within the Fleet's integrated operational model. We also continue to conduct joint exercises with our allies in the region so that we are prepared, together, for any possible conflict.

As Admiral Tofalo mentioned, we have adapted our Tactical Readiness Evaluations (TRE) to emphasis and highlight our warfighting readiness to ensure our submarines are successfully prepared for combat operations during conflict and hostile contingencies. Our submarine command force, where we train our Prospective Commanding and Executive officers for their roles in leading our submarine force, continues to be the best in the world, a "hands-on" laboratory for stressing decision-making and for testing innovations in tactics and techniques that can be rapidly integrated into force doctrine to improve our effectiveness in combat.

We are continuing to advance our sensor technologies to ensure our submarines can detect and track adversaries in order to hold them at risk at even greater distances.

We are practicing and exercising new capabilities that have arisen from technological advancements. In September of this year, as has been mentioned a few times throughout this symposium, I went up personally to stand up Unmanned Undersea Vehicle Squadron ONE, the first of its kind. UUV technology will help us perform across, in, and through the spectrum of today's challenging missions and operations. The establishment of the first UUVRON will ensure we can expertly implement,

manage, and sustain this new technology as necessary to support the undersea fight with the right subject matter experts and Command and Control structure ready to leverage these emerging and force multiplying systems.



The picture you see here is an unmanned aerial vehicle launched from a submarine, which is designed to improve our submarine's organic situational awareness of the battlespace.

Finally, we've begun implementing our expeditionary logistics and ordnance model. Our tenders can service all classes of vessels but are primarily submarine repair assets. The Tender provides a sovereign, mobile, nuclear-capable work site able to deal with emergent material issues overseas. They also provide a mobile repair, re-arming and replenishment capability to fleet commanders when needed. This new logistics model will ensure our submarines can sustain and return to the fight faster than ever.

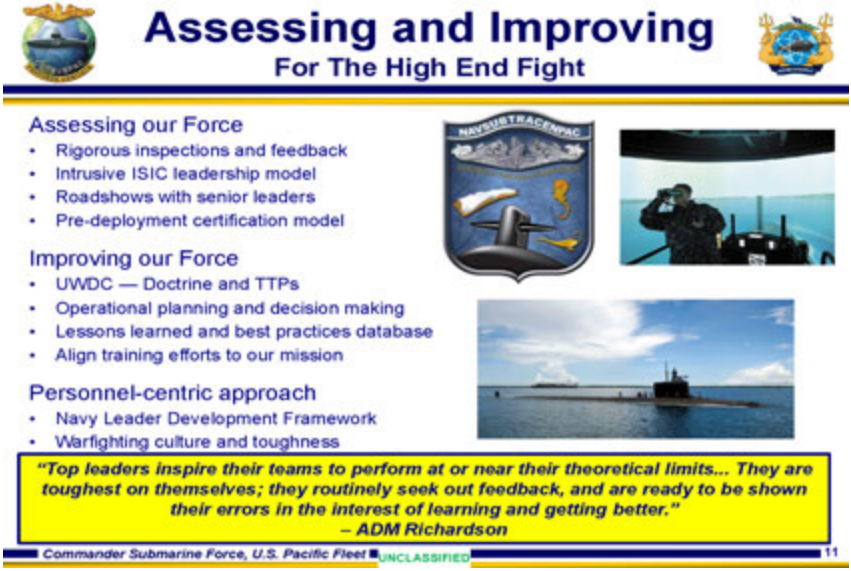
The home port change of the *Emory S. Land* to Guam in December of 2015 has allowed us to always have one Tender in Guam to support the four SSNS home-ported there, as well as our deployed submarines. The tenders are on a rotational deployment model, where one stays in

Guam to tend homeported submarines and deployed SSGNs and SSNs, while the second tender deploys for expeditionary maintenance throughout the 5th and 7th Fleet areas of responsibility.

While practice is no doubt important, we cannot continue to dominate the undersea domain unless we critically assess our performance, so we can continue to make constant and enduring improvements. Our assessments are a vital piece of our operational battle rhythm that identify and correct vulnerable areas before they significantly degrade our readiness. Our inspections are some of the most rigorous in the Navy, and the feedback we get from this thorough approach ensure our crews have a deep understanding of any system deficiency in order to affect corrective actions and retests before being challenged in combat.

Our Submarine Squadrons exemplify and practice an intrusive leadership model. A hands-on approach that ensures maximum awareness of any and all issues on each submarine that allows me to build Force-wide solutions designed to focus, target, and apply additional effort to address weak areas as a natural part of our readiness model.

Our force conducts extensive road shows, regularly sending senior leaders to our waterfronts to pass on lessons learned from major mishaps, while emphasizing and illuminating our commander's intent.



Similar to our inspection process, our comprehensive pre-deployment certification model ensures that before we wave farewell to our submarines, when they leave the pier, that they have the best equipment, knowledge and culture to be successful.

However, these assessments would not generate lasting effects to the problems we identify without a way to capture formally, the lessons learned and best practices. Through the standup of the Undersea Warfighting Development Center – and I see my good friend, Admiral Jimmy Pitts, in the audience – we've centralized our efforts to develop and publish warfighting doctrine. This streamlined process has been a force multiplier in enabling rapid and effective advances of my primary objective, which is to generate the best Forces available for operational commanders to utilize in peacetime missions with the readiness, training, and toughness to succeed as warfighters.

We continue our drive to capture critical lessons learned from every event and exercise, and feed those back into our doctrine to affect meaningful change and improvements to the Force, as fast as possible. Drawing from this regularly improving doctrine, our training is expertly aligned to our mission sets so that our submarines and crews possess the specialized knowledge and experience necessary across the spectrum of their unique tasking. We are able to conduct these assessments and improvements successfully through effective leadership and a personnel-centric approach; creating a culture that fosters excellence in warfighting through critical self-assessment and continual evaluation of our organization, doctrine, training, and policies.

This pillar of our force is directly in line with our CNO's guidance, published in his Navy Leader Development Framework earlier this year when he wrote, "Top leaders inspire their teams to perform at or near their theoretical limits. They are toughest on themselves; they routinely seek out feedback, and are ready to be shown their errors in the interest of learning and getting better." As we grow and evolve as a Force our culture of assessment and continuous improvement is as important as ever, especially in an effort to evolve quickly and win against ever improving adversaries.

Lastly, our submarine force cannot hope to be successful in any high-end fight without resilient Sailors. Our nation is blessed because

our submarine force has the most outstanding and toughest sailors in the world. All you have to do is look at the numbers for an average six-month deployment to conclude that our Sailors are the best the nation has to offer. On average, our submarines steam over 38,000 nautical miles each deployment. For reference, the circumference of the Earth is 21,600 nautical miles, so our submarines nearly circumnavigate the Earth twice each deployment! No matter the operational tempo, no matter how many consecutive days at sea, our sailors do not break. In fact, they excel and grow as undersea warriors.

They continue to qualify and improve themselves as both professionals and individuals. They possess self-sufficiency unrivaled by any other nation. It seems as though at every post-deployment brief I attend I hear a new story of how a boat came up with some incredible method to maintain material readiness in order to remain on station and complete its mission vital to national security.

It's just not our personnel repairing their systems, but the materials themselves that continue to exceed expectations. On a typical deployment we lose less than five percent of our operational days due to material issues. In fact, just this past year, as Admiral Caldwell discussed

yesterday, the USS *Jacksonville*, the second oldest boat in our Force, launched in 1978, completed an almost eight-month deployment with zero days lost due to material problems. This is a testament to both the outstanding design and quality we demand during the construction of our ships, and to the nearly 40 years of superb maintenance by our sailors and maintenance facilities. It is this sense of ownership and flexibility to ensure the job gets done right that makes our submarine force so successful, no matter the challenge or conflict.

There is no doubt that our submarine force is operating in one of the most complex and demanding environments we have ever faced. With so many of our adversaries building up their forces and aggressively attempting to strengthen their global position, it may seem like the challenges that our nation faces are too great for our military to handle. However, with our incredible Sailors, our extraordinary submarines, and our dedication to continuously adapt and overcome, we will continue to stay ahead of the curve. Everyone here today should have complete confidence that our submarine force will always get better, get more capable, and certainly "get faster" in order to promote our values and protect our nation's interests.

I really appreciate the opportunity for allowing me to speak and provide some insights today, and I open the floor to any questions.

NAVAL SUBMARINE LEAGUE
35TH ANNUAL SYMPOSIUM

UNITED STATES SUBMARINE FORCE: GETTING FASTER

VICE ADMIRAL DAVID JOHNSON, USN
PRINCIPAL MILITARY DEPUTY TO THE
ASSISTANT SECRETARY OF THE NAVY
RESEARCH, DEVELOPMENT, AND ACQUISITION

It's always a pleasure to address this group. Like you said, it's like family. It's like being here – well, I think it's been at least probably 15 years I've been going to Naval Submarine League events. And then as Jay said, probably the last almost 10 years as either a PM or a PEO or the PMD – a lot of "P" words there – I've been blessed to be able to address this group. You'll see why when my talk is through.

My talk is supposed to really cover broader than just the submarine force, and you'll see as I weave in some of those that go with our excellence in the submarine force. I'm going to give you a view of the broader Department of Navy acquisition achievements and how we're changing to this rapidly changing environment that Daryl talked about. And also, my view of industry's part.

We have a new secretary, Secretary Spencer, our 76th Secretary of the Navy, and he recently published his priorities: people, capabilities and processes, which is the underpinnings of making our Navy team stronger. And I really should say our naval team, Navy and Marine Corps team, stronger, more responsive and more lethal. He calls us to renew our sense of urgency and speed of execution throughout the entire organization, and we are doing just that.

I am ever impressed with the scope of our Navy and Marine Corps teams, acquisition, modernization, sustainment work, from the Joint Strike Fighter to the Amphibious Combat Vehicles, the Flight 3 DDGs to Virginia-class SSNs, over $60 billion of procurement and research and development every year. Secretary Stackley, he has departed the building after nine years of being RDA and, for a period, acting secretary of the Navy for the last seven months. A true national asset. It's hard to over-

state the impact that Secretary Stackley has had on our Navy and Marine Corps teams' success.

Fortunately for us, good people attract a good team. Secretary Stackley left behind a strong team that is able to keep our Navy and Marine Corps' acquisition and research and development on course. So, I just want to give you a few examples of what has been done just since January of '17.

We've had a lot of christenings, nine christenings, deliveries, commissionings, major contract awards, and even other significant events like milestones. You'll see this in the delivery we had two this year for our Virginia-class submarines. We got the mighty *Washington* and the *Colorado* delivered. I was fortunate enough to just participate in the *South Dakota's* christening with D.B. Dempsey as the sponsor. What a fabulous event.

But you can see that the work of the Navy progresses on and it's across the spectrum, from DDGs to LCSs to carriers to Joint High Speed Vessels to Virginia-class submarines. Even the work in our missile and weapons business, you can see a Standard Missile 6 test right there.

But even more in the air business, you look at the content for unmanned, this thing called Triton, a fabulous capability. It sent full motion

video over a common data link to the Ike -- that's what that says -- and completed its joint integrated test on Link 16. So that thing can see and it can communicate, and I think it will bring a really game changing capability to our force.

We also are in the weapons business. You see AARGM, we know that as AIM-120D, which is the premier missile used by our Naval air forces. We also do helicopters. The Marines are recapitalizing their heavy lift capacity, which is CH-53K King Stallion. What an unbelievable aircraft that is.

I was fortunate enough to go to Sikorsky and talk to them there, and you know what? Sikorsky designs reduction gears. Actually, if you look at the top of a 53K, it looks a lot like a submarine reduction gear. It is taller than I am, that's how heavy that gear is when you're lifting something that's got near 100,000 pounds between the aircraft and what you're pulling underneath it. It's just an incredible aircraft.

We also do things like the presidential aircraft or presidential helo, which is also done at Sikorsky in Oswego. We just had the chance, Secretary Spencer and myself, we went up to there and visited with Ms. Houston and her team at Oswego. What a great event. Six o'clock on Fri-

day evening all those folks were there because they wanted to be there- and listen to the Secretary and actually celebrate the work that they do there. It just makes you feel good about the work we do every day in the Department of Defense.

The MQ-25 Stingray I-well, I'll talk about that a little bit later. Also, we have this thing called the Advanced Arresting Gear and the EMALS, our aircraft launch system. Those are actually being exercised as we speak, because the *Ford* is underway, (catting and trapping) using those systems.

Even beyond that with my Marine Corps team brothers, the Joint Light Tactical Vehicles with the Army. We're upgrading the Amphbious Assault Vehicle, think of that, all the way back to the Vietnam era, a new transmission, survivability upgrades. The Marines are about to get almost like a SPY 1D on the ground. It's the GATOR, Ground, Air, Task Oriented Radar. It's a gallium arsenide right now, later to gallium nitride

radar, a fabulous capability. If you link that with the Common Aviation Command and Control System, they will be able to do some work from the shore for the Navy and Marine Corps team.

Also, very much into the unmanned business, you see the RQ-21

Blackjack there in the lower right corner, which is deployed currently today with a Marine Expeditionary Unit. So, we're moving fast, and of course the Marines large acquisition is the Amphibious Combat Vehicle. ACV 1.1 is the initial tranche, two vendors, and they're out testing. As a matter of fact, Jimmy Smith, who is my DASN E&LM is out there looking at that today.

R&D, the press does not stop on the work of developing our folks. If you look at the lower right on there, additive manufacturing is obviously a big deal. We had a very interesting event in the Pentagon where we set up a 3D printathon. Folks went around and could see actually how we're making a difference in the field, from small stuff to big stuff. This is definitely a growth area and it actually can be very much of a game changer and enabler to help improve our availability of assets in the field because you can just make them right there at the point of use.

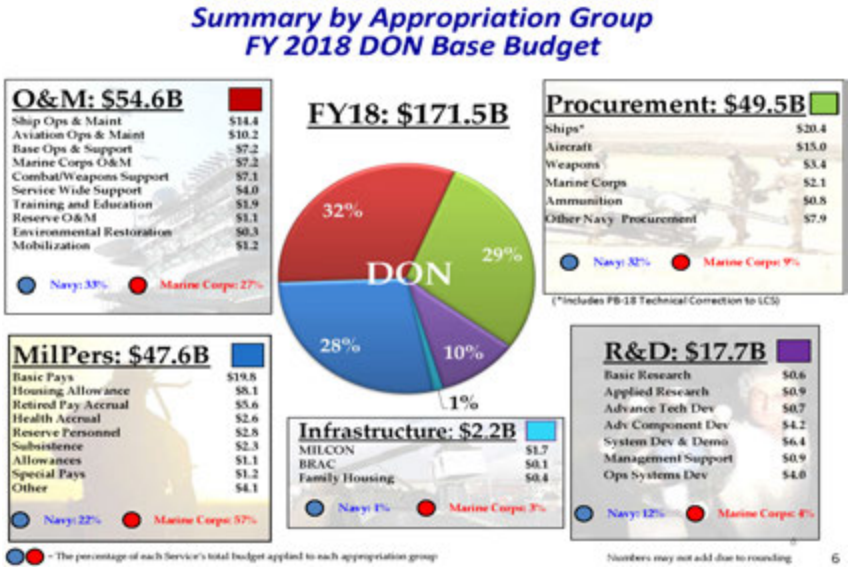
Also, we had a fabulous ship-to-shore maneuver experiment,we called it as part of ANTX, it was a very unique event out at Camp Pendleton and we brought the Commandant of the Marine Corps out there. I'm somewhere in that crowd of folks. It really gave us a way to see how unmanned can change the calculus of bringing ashore capability, establishing networks and bringing the fight without putting the Marine at risk. And then using those unmanned assets to directly - actually go with the manned asset to go after the threat. It was really a very unique experiment.

That progresses in GATOR, and so there is a way to actually take away the experiment and move it into something that goes to the next step and eventually ends up as an enabling capability in the fleet's hands. It was very, very well done. That's a pretty good quick sweep through. Now, unfortunately, I have to go back to the Pentagon.

So back at the Pentagon, it's the budget. When I became PMD, Secretary Stackley said, Dave, it's budget, budget, and nothing but the budget, and he was right. We are in the middle of still finishing the fiscal year '18 budget. We have been engaging with the authorizers and the PSMs even as late as this week working as they get their bills finalized, as well as with the appropriators.

Next year's budget, Program Objective Memorandum '19, POM, it's with our secretary of defense friends and it is actively being worked with

the services. POM '20, it's happening, because the CNO's guidance for 2020 strategically guides what we program for and deliver for capability.



That is actually a draft and we should be finalizing that here in the next few weeks. So, it's moving.

We are entering a period of historic growth and stability for platforms, weapons and warfare systems. Aircraft, the Joint Strike Fighter, with the procurement of 445 aircraft across a three-year block buy, that's lots, 12-14, that includes the United States, Navy and Marine Corps and Air Force, and partner nations aircraft. In the long run the U.S. will steady up on something over 90-plus aircraft a year between the U.S. Air Force and the Naval forces.

F-18 E/F Super Hornets, I think we're going to keep building them and we'll build them potentially even up at rates as high as 24 per year all the way through potentially the FYDP. E-2D, Advanced Hawkeyes, you want to talk a game changing aircraft in our fight for the future, the E-2D is it and we'll build those at four to six per year.

Ships, as this audience knows, we're getting Virginia-class submarines. The plan of record will meet two a year all the way through Columbia. There's even some discussion of potentially plugging in three a

year at certain key points, all in the pre-decisional phase. SSBNs we'll be at one a year. We'll be cranking them out from FY '26 on for those Columbia-class SSBNs.

DDGs, two to three a year, so basically something like a one-two, one-two, or two-three, two-three. It's just math. If you want to have 66 submarines you build them at two a year with a 33 year life. It's the same thing for the large surface combatants, and that's the way we're looking ahead.

CVNs, we're currently today on five year centers, and we're even looking at going to three and a half year centers as a possible acceleration to reduce costs and move us more towards the goal of 12 CVNs. And then LCSs and frigates, getting us to two to three ships per year.

But that's not all. Missiles are also in this mix. The Standard Missile at 125 per year, again, a game changing missile capability. I'll just rattle off a few of the other things that we are doing: maritime strike Tomahawk; LRASM, which I'll cover later; AARGM, which I showed a picture of; the AIM-120D; HARPOON block II-plus;, the Evolved Sea Sparrow Missile, and more at optimal rates.

This department and this secretary of Defense and the deputy are very interested in us working at or above minimum sustaining rates for our weapons. And, of course, torpedoes, with the Mark 48 restart, its upgrades, and the Mark 54 Mod 1 profile ramping as we field those advanced capabilities. So, in this context, we have to build a framework for the CNOs push for what he calls exponential growth and capability. And we have to deliver this more powerful fleet not later, but in the 2020s.

So how do we get at this? I see five elements. We have to get digital. We have to modernize. We have to start right with industry and foreign requirements, and we have to rapidly innovate, and yes, we have to reform.

I'll go through each of those, and I'll start with get digital. The Digital Warfare Office has been stood up under Ms. Margie Palmieri , and I have a deputy for her, Captain Select Anderson. He's an Engineering Duty Officer in OPNAV N2N6 under Vice Admiral Jan Tighe.

The DWO brings together efforts across the warfare sponsors and drives the Navy's efforts to effectively use and fuse our existing data, the push for Big Data analytics, and predictive analysis, and leads cross-

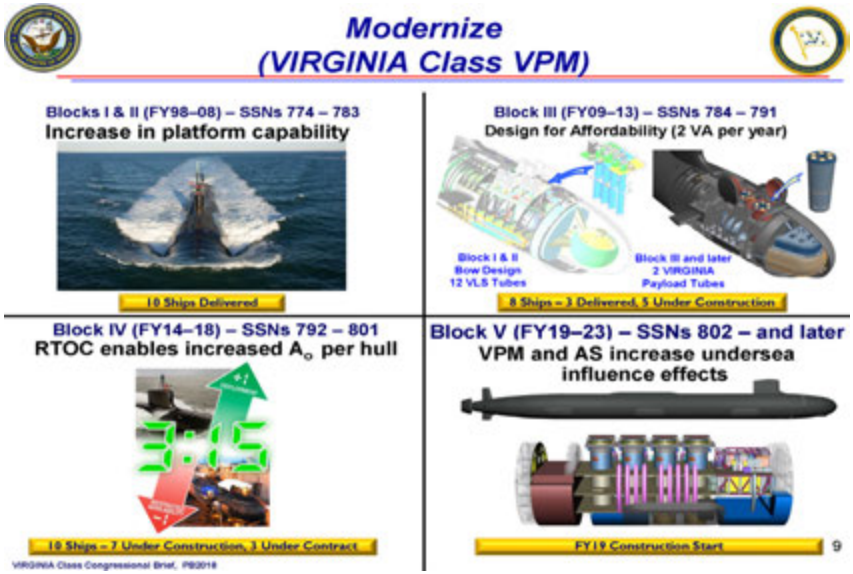
PEO digital warfare pilots. Two of my PEOs are intimately involved, PEO unmanned weapons and PEO integrated warfare systems, to net

and use the power of our Navy's data in new ways that exponentially increase our combat effectiveness. I'm only touching the surface here. This is truly revolutionary work and is where our CNO is driving our Navy.

Modernize. The CNO states in the Future Navy paper, that we must design in the ability to modernize: plug and play hardware matched with the software and reprogrammability to make upgrades quicker and more affordable even as we stay more capable. This is the submarine modernization model and it is being followed by the surface ship and even the Joint Strike Fighter programs. I call them receptors, designing and building the open architecture platforms with combat weapon and sensing system upgradability.

I'm talking about more than just combat system and electronic systems upgradeability. It's hull, mechanical and electrical modularity that enables affordable and timely upgrades. Virginia Block 3, the first of which Vice Admiral Tofalo referred to in his remarks, the *North Dakota*, has Virginia Payload tubes, and 87-inch diameter common interface pulled through from the SSGNs and enabling Tomahawk, multiple all-

up-round canister use, UUV payload transfer system and future payload insertion affordably and quickly because the supporting infrastructure



was built in with margin for growth and change. This submarine industry has led the way and must continue to do so.

The next step, the Virginia Payload Module in Block V is only possible because during Virginia's design in the 1990s the team envisioned hull plugs to advance the ships capability, an idea thought up over 25 years ago. That is now coming to reality in the 2019 to 2023 Block V multi-year contract. Even closer is *South Dakota*, an FY '13 authorized ship which the Navy is using as a technology demonstrator to prove out advanced technologies.

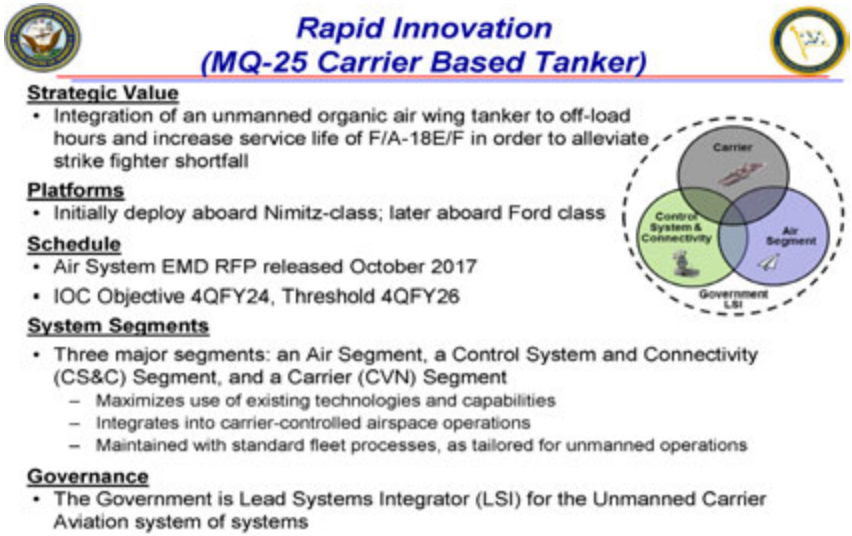
Lessons learned from *South Dakota* will be incorporated into Block V and later Virginia-class submarines. The right design with a knowledgeable Navy-industry team to evolve the design to respond to a continuously changing threat, that is what keeps our naval capability moving at relevant speed. Modernizing our existing platforms is the fastest way to field advanced capability at capacity and move our naval capability up.

Three, industry and foreign requirements. The Navy's future frigate, it is a model along with the MQ-25A -- which I'll discuss later -- for how

the Navy works with industry to inform its requirements and get them right from the start. The frigate team worked within the Navy, between the fleet, the Pentagon and the acquirers, the PEOs and the PMs that fully develop the trade space for what the Navy needed to fight in the distributed maritime operations environment; the concept of operations, the Navy's current systems and planned upgrades and cost and schedules. We then, only after that, went out to the industry with a very well thought out request for information in July to get industry's view on achievability, the breadth of potential solutions globally, possible trades and potential costs.

The result was an industry informed and fully vetted CNO approved requirement on the 3rd of October. That will go forward for the concept designs in the next phase this fall. With speed and precision, the Navy and Industry were able to do the hard work up front to speed the acquisition and drive toward a platform that the Navy needs, all on a schedule for late FY 2020 award.

MQ-25A, the Maritime Accelerated Capability Office is in full form and continues to evolve. The stingray, carrier-based tanker released its request for proposal a month ago and will be down-selected and on contract by the end of this fiscal year, with an IOC of 2024. For our new



carrier-based aircraft, this is fast. But expectation is that once an industry partner is selected we'll be able to go even faster.

The MQ-25A is a model for Navy technical leadership as the system integrator and for industry input into the requirements, and into the acquisition approach, between a draft RP, several one-on-one sessions with the four competitors, funded concept refinement studies to develop the trade space and an industry informed requirement much like FFG(X). I've never seen it done better than what Rear Admiral Mark Darrah and his PEO U&W team (unmanned aviation and strike weapons) accomplished. More groundbreaking work, but that is not all

Under Captain John Rucker the UUV family of systems, with the snakehead large displacement UUV, ORCA-XL UUVs, they're moving ahead with streamlined decision chains, knowledge point acquisition and focus teams to keep the press on rapid fielding. Also included are the surface naval laser weapon family of systems and the expeditionary SURTASS capability from an expeditionary EPF. Something fast, it's a joint high-speed vessel, if you can remember that.

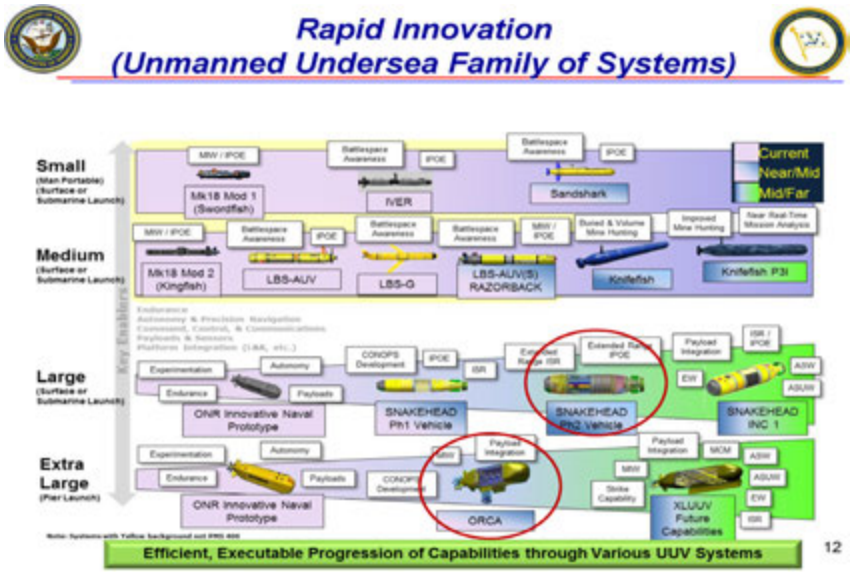
MACO and RPED, they will continue to be evolved, and believe me, it has the personal attention of both the Chief of Naval Operations and the Acting RDA. This rapid acquisition I'm discussing has even a better near term example, the Long Range Anti-ship Cruise Missile. This program under Captain Todd Huber, was awarded Aviation Week's laureate for defense programs and is a model program for accelerated acquisition, developing a technically challenging weapon on an accelerated timeline affordably and meeting the warfighter needs.

In only two and a half years from the requirement CDD, LRASM is in integrated tests with ITE-1 taking place last August. That is a dropping out of the B-1 bomber you see there, with an early operational capability on the Air Force's B-1 next year, and the F-18 E/F in 2019. Simply superb performance that is happening today and it's proof that the Navy-industry team can move at relevant speed when this team puts its will and its resources to the task.

One might ask, why or how did Todd and his team do this? What's their model? It's simply the model that all our rapid acquisitions are following.

A lead, in this case it was called the LRASM Deployment Office,

but a lead set up specifically within the program for LRASM. The use of knowledge points, program milestones, close interaction with industry, a tight team of developers, users and testers, a high reliance on high-end



modeling and simulation, to retire the risk based on results. Targeted in-air tests, monthly sessions with MDA. Yesterday we just held another executive steering board on LRASM, and not just me but with all the stakeholders, to assess and steer the program progress and quickly resolve issues, be they technical, financial or contractual, all with short decision chains.

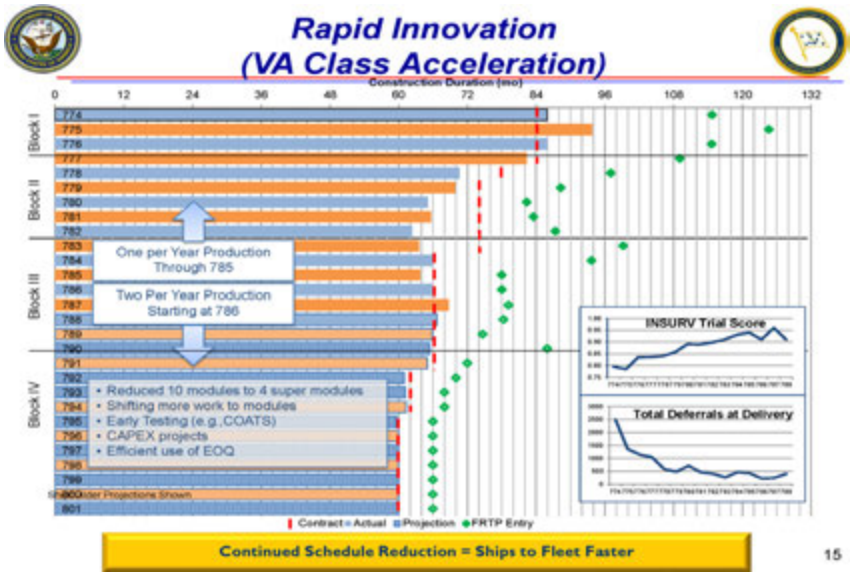
The ability to engage the right level of leadership quickly to get obstacles removed and problems solved is a key element to this rapid business. Many of these same processes are being used in the MQ-25A, UUVs, and more broadly across the acquisition enterprise. Streamlining the process is critical. Even more critical is having the right team doing the work.

A government-industry team of knowledgeable, empowered, experienced professionals can make the right decisions at the right time. I've referenced before the U.S. Air Force's study on owning the technical baseline as a model for principles applicable to getting acquisition of even high-risk capability done rapidly. I recommend you spend the time and give it a read.

Taking even a step further back from where we've come, rapid innovation. Implicit in our team's ability to deliver capabilities to keep at that capacity side of the equation, driving excellence in execution, building CVNs, the SSNs and DDGs that form the backbone of our Navy's fleet, rapid acquisition has scale. What's fast for a missile or a UUV is different from what's fast for a major ship platform.

We should strive to minimize design and build timelines looking for what's inhibiting faster delivery to the fleet. The effort to drive Virginia-class from 84 to 60 months, cutting two years off the build time, this audience did just that. You moved the needle and sped ship deliveries through engineering, manufacturing and contracting, ships with ever improving capability and quality. That same focus is what's required to meet this historic growth in submarine workload with a sustained two per year Virginia and one per year Columbia, a doubling of the workload across the enterprise.

Adding to the scale is technology and change: added Virginia Payload Modules, acoustic superiority, restart of the missile compartment industrial base, and the first modern electric drive submarine. Keeping the industrial base on plan is the number one priority for the submarine



force. Issues here will overwhelm our teams and detriment progress elsewhere. The Virginia-Columbia integrated enterprise plan is the single most important effort that this team here today has to face in this next decade.

And finally, I have to talk about this "R" word, reform, a major thrust within the Department of Defense. Reform of our processes and approaches so that we within the Navy do absolutely everything we can to drive down cost. For acquisition, it means using the tools we're all well familiar with for better buying power and ship costs, driving multi-year procurements and block buys, pricing at market rates, improving contracting, including shortening the timelines, procuring at more economic rates, and building stability into our profiles, all common-sense approaches to acquisition.

This line of reform thinking, relooking at how we do business, assessing our approaches with all its internal biases, assumptions and inertia, it all fits the construct that in the end we really do have to be prepared to fight and win today and tomorrow. That is why there's the press today for rapid acquisition that's agile, modern and sustained, to get at the Navy we need as fast as theoretically possible. We must, in the words

of DOD guidance, quote, "Move at the speed of relevancy and adapt to today's challenges and prepare for tomorrow's threats," unquote.

But there's more. In my prior talks, I've noted the tremendous achievements from our acquisition system and covered the competitive environment we're seeing every day from China, Russia, Iran, North Korea and violent extremist organizations. These competitors are transforming themselves before our eyes. I refer back to a CNO quote I've used before on competition.

One, going back to this idea of competition, "all of our leaders have got to be waking up every morning and spending their day thinking about how they can beat the competition. We have got to get competitive," unquote. I see two ingredients here in this business that we're in here every day, process and culture.

Starting with process, that's a SECNAV top three priority and it's Congress' call to reorganize DOD acquisition and R&D for our nation's competitive advantage to achieve the overarching objectives of technical superiority and weapons system affordability. The 2017 NDAA, Section 901, called for the reorganization of the undersecretary of defense for AT&L. It has to be done by 1 February next year into two entities. I will not discuss the chief management office, but really focus on the undersecretary of defense for research and engineering to drive innovation and accelerate advancement of our warfighting capability, and the undersecretary of defense for acquisition and sustainment to deliver proven technology into the hands of the warfighter more quickly and affordably.

This new organization refocuses the office of the secretary of defense's principal role from program oversight to that of direction of major department investments to ensure integrated, technically superior capability that consistently outpaces the threat. The "901 report" is publicly available and it's worth the read. Nurturing and maturing the right technologies for success handoff to the acquisition side, that is critical to our success.

Congress has provided the department with the impetus to significantly streamline the acquisition organization and assign greater responsibility, accountability and authority to where the expertise lies in the services for program execution and performance. This is critically important. This is a critically important change to the OSD oversight vector

of the past, to a supporting role vector for the future.

Congress' intent, it's about our own ability to beat the competition, and it goes far beyond reorganizations and just process. It really is about culture, an environment where always looking for a better way is expected and held accountable for. For those of you who listened to me talk in September, this is the same example I used.

I recently finished listening to the biography of Elon Musk, the founder of Tesla, Space-X and Solar City, a true innovator. His success was not by brilliance alone, it was more about how he approached the problem, setting what seemed like unachievable goals and achieving them. In 2004 Space-X needed an actuator that would trigger the gimbal axle to steer the upper stage of the Falcon 1 rocket. Musk was quoted $120,000 for the actuator.

Musk thought that was ridiculous, thinking it no more complex than a garage door opener. He put his engineer to the task of designing one that cost no more than $5,000. Nine months later his engineer did just that, delivering an actuator that accomplished the task for $3,900, about 1/30th the original quote. Getting there extracted every ounce of innovation, knowledge and perseverance out of that engineer.

While it's a great story, it has application here. You see, Elon Musk was technically savvy about his rockets and knew what was theoretically achievable when he gave the engineer that task. Now, I know the same is true of our undersea enterprise. We submariners, we pride ourselves on our technical knowledge of the details and our understanding of the business.

Like Elon Musk, we should use our innate knowledge to set our standards and goals at levels we would have thought impossible. I can tell you no one in 2005 thought we would take two years out of the Virginia build and 20 percent out of the cost, while redesigning with a new bow and improving capability, but we did. We can do the same as Elon Musk did for Space-X and Tesla, applying our rigor, our knowledge and our drive and expertise to move faster responsibly and affordably.

So, in closing, I've only given you a high-level look at what I see as ways which we together can get at rapidly developing capability and capacity to the fleet affordably. It is stable acquisition profiles for open architected platforms that lays the foundation for rapid capability inser-

tion via well thought out modernization approaches, such as SWFTS and payload tubes for submarines, and continuous development of game changing seed corn technologies and approaches that bring capability with the right balance of technological risk, cost and supportability to the fleet, all on relevant timelines.

We are at an inflection point. Our competitors are outpacing us and are delivering capability designed to defeat us at our game. We have to change the calculus.

Even in the undersea domain we should not feel comfortable. N97's capital submarine enterprise plan, the TCEP, it is a call to move ahead to drive innovation and to move. This is not mission impossible. I am convinced we have the intellectual capital within this very room to take on this national challenge.

We must keep at it, and by it, I mean a series of action verbs: execute; invest; innovate; communicate; think long term; deliver; improve; drive costs, a relentless pursuit, not the tyranny of the learning curve; own; lead; expect, no, demand that we accomplish what we once thought was impossible; all basic stuff. That is the mindset that we need and is a difference between winning and losing. We must approach this as a national endeavor and win this competition. I am convinced it is within our own power to do so.

Thank you.

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NAVAL SUBMARINE LEAGUE
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UNITED STATES SUBMARINE FORCE: GETTING FASTER

VICE ADMIRAL ROBERT BURKE, USN
DEPUTY CHIEF OF NAVAL OPERATIONS
MANPOWER, PERSONNEL, TRAINING, AND EDUCATION

Thank you for that kind introduction, Admiral Donnelly. It's really a privilege to be here. I'd like to start off by thanking our host, the Naval Submarine League, for everything that you do for our force each and every day. It's just really a privilege to be here with this group. I'd also like to thank all of the sponsors that made this event possible, and I'd also like to say congratulations to all the awardees who we're going to recognize shortly.

I have to admit when Admiral Donnelly reached out a few weeks ago to ask me to speak at today's lunch, I had two reactions. The first one was I realized somebody really good must have canceled. The second one came after I got my marching orders from Admiral Donald because when we talked he said – I kind of asked him, what do you want me to talk about? Well, I kind of want you to give them an idea of everything that's going on in the personnel world. You know, kind of cover it all. Take all the time you need, as long as it's less than 50 minutes.

That's when I had my flashback to when I was doing my acceptance interview at Naval Reactors 35 years ago. Define the universe, be brief, be specific. I faked my way through that interview adequately, so I'm going to give this one a try too.

This year's theme "U.S. Submarines Getting Faster" couldn't be more appropriate given the speed at which our world is changing. It's an unrelenting pace. I know you've been talking about it for the last day and a half and it's very consistent with the central idea of our design for maintaining maritime superiority. And again, you've been talking about that with a number of the speakers throughout the last day and a half.

But we just can't afford to continue doing business as usual, and the people business is no exception. Part of my role as the Chief of Naval

Personnel is to make sure that we continue to have the best possible force in terms of people. That means, at least in part, knowing what kind of force we need.

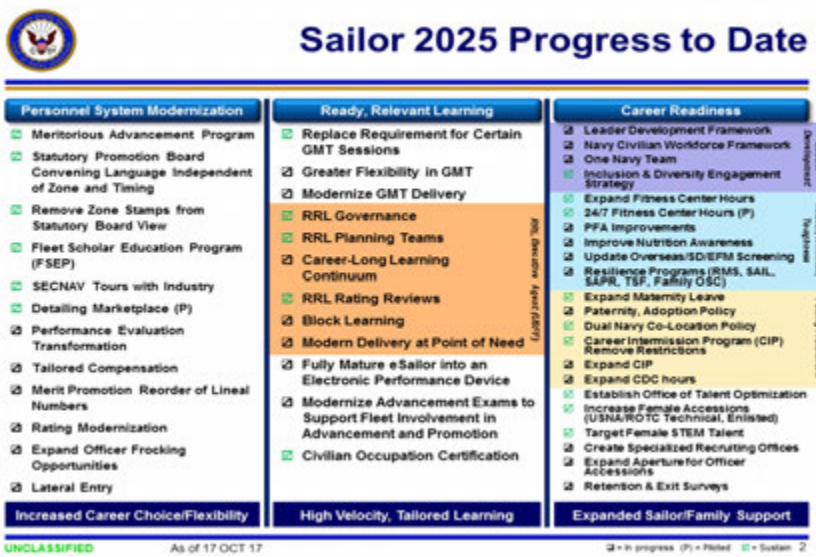
We're serving during a very challenging operational time to be sure, but it's also a very dynamic time. We are, if nothing else, sort of on the precipice of large changes. I think those changes are going to require us to think in new ways.

If you're a student of history, I also sort of think that it's a time not unlike the inter-war period of the 1930s when we were experimenting with things like naval aviation and War Plan Orange. But really, in the back of our collective minds, as warfighters, we really sort of thought that we were going to fight the war at sea with battleships, until they were gone. But I think it's clear, just like in that time, we are once again in a maritime era which makes it an exciting time to be in the Navy, even with all the challenges that we have ahead.

But with those challenges -- I'm optimistic about our ability to meet those challenges because throughout our history the one constant has been our strength as the United States Navy: our people, our Navy team, our sailors active and reserve component, our Navy civilians, our industrial partners, our families; our collective ability to innovate, the resourcefulness, the creativity and the toughness that we are always able to muster. So I think it's important that we not lose sight of the fact that we have to continue to adequately invest in our people, even as we move to unmanned systems, because we are going to provide the command and control of those systems, I hope, not the other way around, unless we're building SkyNet or something like that. So it's what we do day-in and day-out, at sea and in the air, how rigorously we insist on training and qualifying our sailors, how we train them to fight hurt, how we lead them, and most importantly how we develop, mentor, and I use the word sponsor, our critical thinkers, our strategic thinkers of tomorrow. That, as much as any acquisition program, is going to determine our ability to meet those future challenges, maybe even determine the outcome of battles years from now.

So this is my team's collective contribution to the design, the gold line of effort, which is strengthen our Navy team for the future. We are committed to getting faster and producing sailors with the right skills so

we can ensure our ships, submarines and aviation squadrons are properly manned not only today, but long into the future. We're doing that through a group of about 45 initiatives today. It's a living, breathing group of initiatives collectively known as Sailor 2025, and it's aimed at growing, building and empowering today's sailors and the sailors of the future.



This is a little bit of a report card of where we are today with Sailor 2025. This started when I was working for Admiral Moran as M-13, and it was his initial vision. At the time when it was conceived, this was really an effort at getting after the war for talent that we predicted would be coming. It was about attracting and retaining that talent, providing choices, career flexibility and transparency in our processes so that we could emulate a lot of what we were seeing the Fortune 500 companies doing and help us in that war for talent.

A few years later, I can tell you that we are very much in that war for talent. We're beginning to see our recruiting, we're at 128 consecutive months of meeting our recruiting goal, but we're seeing fraying at the edges. Retention is beginning to turn in key areas, and that's happening just as we're awaiting the formal order to begin growing the Navy.

But today, this is about 45 initiatives. Some of them are very mature.

We started and killed some, and we're just about to launch other ones.

We're not doing this as D.C. business as usual. We're rolling them out, we're putting quick risk mitigations in place, we're learning using high velocity learning, if you will, and modifying them quickly to – as we learn to expand them we'll put controls on them as appropriate.

As we began to learn from this we saw another opportunity to gain more from Sailor 2025, not just to make this useful in terms of the war for talent. We leveraged this in terms of our ability to help us with readiness. There's really two aspects of that.

The first aspect is in terms of our FIT of sailors. We talk about FIT in the manpower business in a number of different ways, but the fleet measures our ability to provide FIT in terms of the right rating or the occupational skill of the sailors and the right rank, which is a very sort of gross metric. But the sailors have individual Navy enlisted classification codes and an individual sailor might have four or five of those sub-skills.

There's no demand signal in our industrial age personnel system for those individual skill codes. It's very ad hoc. You could be on an Arleigh Burke destroyer that's in one phase of modernization and be an electronics technician and be on the exact same ship class destroyer in a different phase of modernization and need five completely different skill codes. We don't manage it to that degree of fidelity.

So we put a system in place last year to track it much more rigorously and help us in the people system produce sailors with that level of fidelity. We're about two years out from getting the steady state. It seems like an obvious thing, but because we were in this kind of industrial age production mode, we're still playing catch up with that. We want to get to the point where we are predictive in meeting the needs of the fleet and not having to do substitutions at the last minute before ships deploy. So this idea of FIT with those very detailed levels of skill sets is very important to readiness.

And then the last aspect of readiness is the sustainability of our personnel system. Fundamentally, we haven't changed anything about our personnel system since the draft went away. We recruit on the order of 40,000 people every year. We also send about 40,000 people home every year.

There's not a Fortune 500 company in America that does business

that way. It's unaffordable. It's not wise. You can't get a return on investment that way, and it's not wise for us to continue doing that.

When the draft went away we changed our operating model by throwing money at it. We don't have more money, and even if we did it wouldn't change folks' behavior because we've reached that knee on the curve where it can no longer influence behavior sufficiently. Not only that, we're well past the point where even if there were an unlimited line of people at the front door waiting to come in the Navy, and there aren't, it takes upwards of two years on average to train enlisted sailors to get them ready for the technical skills we need. So it's a long process and we can't afford to bring them in, chew them up, spit them out, and assume we can just make more.

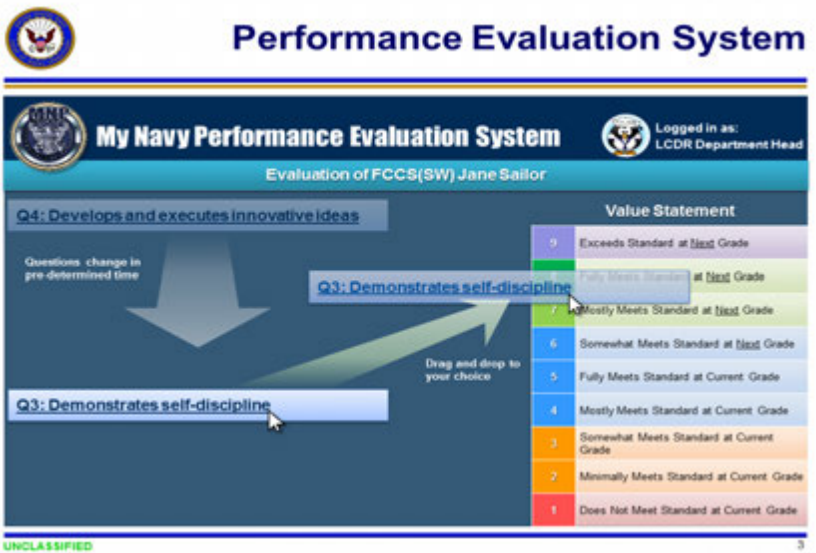
So we have to build a personnel system that rather than having a personnel pyramid that is very broad at the base, we need one that has a narrower base and is taller. Sailor 2025 is aimed at doing that, providing opportunities to perhaps change career paths if we need them to because the needs of the Navy change, or the enemy, the adversaries, they get a vote, the world changes so we need to reshape the Navy, or we put them in a bad place initially for their skills or their desires, and we need to repurpose them. And because as I approach 60, 60 is the new 20, and people are going to be productive a lot longer and we can keep them around a lot longer.

Last year we got authorities for 40-year career paths for officers in selected designators. We'll do the same thing on enlisted career paths. This year we extended tenure for enlisted folks. Longer career paths make a lot of sense for a lot of different reasons. So there's a whole host of items in here.

But if you look at it in its simplest phase, the first level of effort there is a wholesale modernization of the personnel system, long overdue. It's things like the Fleet Scholar Program, which is a very competitive program for senior enlisted folks and junior officers to go to civilian institutions in residence. It's small numbers on the order of 30 folks a year and it complements our naval educational institutions. It doesn't replace them. But we didn't have an in-residence opportunity like this before at civilian institutions, and it's very, very competitive.

It's things like tours with industry, another very competitive program

where we send senior enlisted folks and junior officers into places that we have agreements with. Some of the companies represented right in this room, defense industries, commercial industries like Amazon, Google, Apple. We'll send a junior officer out for a year and a half or two years to learn their best practices and bring them back to the Navy. It's a good retention tool for the Navy. It also brings us best practices back and helps us improve our processes within the Navy.



We're overhauling the fitness report and evaluation system in a significantly radical way that gets after the behavioral science that has caused us to have to overhaul 52 times in the last 242 years, because reporting seniors don't like to deliver bad news to the people that they grade. So we're in the midst of doing that. When we're done with that and can really get at evaluating people's character, ultimately, it's going to change the way that we choose our commanding officers and the way that we run selection boards. Instead of spending millions of dollars a year to find people into our state of the art 1998 selection board system in Millington, Tennessee, perhaps we'll do it virtually, distributed in time and space at locations throughout the year across the country.

So, there are a lot of different things like that. Rating modernization

is the tool by which we'll allow our career enlisted force to move into different occupations, because so many of their skill sets have common foundations of training. With the advent of ready relevant learning, that I'll talk about here in a minute, we're going to have our training capacity distributed to the waterfront in mobile modular fashion, and they'll be able to quickly and inexpensively gain additional training that will not allow them to change into another rate, but to gain additional skills and do both jobs. That's what ready, relevant learning is, an enabler for that.

But ready, relevant learning is taking us from doing the careers with the training up front for our enlisted force, and doing it like we do for officers, the right training at the right time in the career path, instead of doing it all upfront like we do today which results in 50 percent of our enlisted force not using that maintenance training that we invest in. They get out and never use it. The other thing that happens for those that do stay in, they come back, and we've modernized the ship or aircraft that they work on and the training is still relevant. Then we have chiefs showing up at the platform and they've never seen the system before, and that's not setting them up for success.

The training delivery methods are about virtual reality, putting the sailors in the environment so they can train and simulate environments that let them do hands on in volume in ways that we can't replicate with real systems, because people learn by doing, not by sitting in classrooms looking at PowerPoint slides. We've got a lot of theory to practice data to back that up. It's things like the submarine force has been using for a while now, like the Modular Reconfigure Training System in place up at the submarine school and submarine learning centers. People learn by using tools like that, and we've branched that out into other areas within the Navy.

So it's very promising. We'll have that in place Navy-wide by 2021, 2022. The training centers will be at the waterfront. There will be booths and classrooms. Sailors won't meet a quota, it will be asynchronous.

We'll still have instructors, though, we're not going to do away with instructors. This won't be SWOS-in-a-box type of thing that was experimented with 10 years ago. We're not going to do that again.

And then the last column is career readiness, which is a smorgasbord of different initiatives, but leader development. The new aspect here is a

refocus on character because the Navy relies on the trust of our leadership. We have a special obligation to be trusted by our civilian leadership because of the nature of our operations going over the horizon and out of communications the way we do, in particular in the submarine force, but the entire Navy as a whole, and the trust that our subordinates have to have in us as leaders because of the situations that we operate in.

We do this one time inoculation at our commissioning sources, the Naval Academy and ROTC boot camp. It's not enough. Character is like a muscle or like being an athlete. If you exercise it, you can make it stronger. So we're going to do that at the community level, at the big Navy level.

We're working on fitness as a culture. We're not trying to turn sailors into triathletes, we just want them to be healthy, to live longer, to stay out of the medical centers and stay at work longer. There's a lot of work going on with respect to that.

We're working to make the Navy a more family friendly service, which is an operational imperative for a couple of different reasons. It's not just a political correctness issue, but it's an operational imperative both to male and female retention. I'll tell you, we are operationally dependent on the talent with the women that we're bringing into the Navy.

Twenty-six percent of our enlisted ascensions right now are women. Twenty-seven percent of last year's graduating class at the Naval Academy were women. Six of the top 10 graduates were women. Fifty-two percent of the technical graduates in the United States at colleges are women. That's where the talent is.

But this is not just a women thing, it's equal for men and women. We are a sea going service. Long deployments and family separation is a way of life in the Navy. But we put a lot of unnecessary obstacles in the way of starting a family and raising a family in the Navy, so we're trying to eliminate those as fast as possible.

It's things like the Career Intermission Program which allows sailors to take a two to three year time out on their career, come back in, reset their lineal number, if you're an officer, or come in with a different peer group if you're an enlisted professional, and compete with a new peer group for advancement. We've had 140 sailors do that, officers included, come back in, compete even for command or statutory billets for promo-

tion. All that were eligible have made it through their next wicket, so it appears to be working.

The thing I find surprising is that the numbers are so low of people that are using it. We have this cultural bias that if you do this you're a slacker. If you take one of these time outs you're not doing your job.

The same thing with maternity leave. We increased it from six weeks to 12 weeks last year. Women feel pressure to not take their entire entitlement because they may be penalized on their fitness report or their eval. We're working to change that culture. That will come with time.

Child development center hours and capacity. We've expanded hours throughout FY '17. We're working on capacity. We're working on spouse hiring initiatives. So a whole host of things going on across the board. We've got to do more. We're working on them. We get our best ideas from the fleet. I'd certainly be interested on what you think we could take on to help add to this list. Next slide, please.

We're kind of working this right now through the whole force, and we know that we can't keep doing that. Under the hood we've got to get smarter. We've got to work smarter, not just harder. So about six months after we really laid into what we need to do, we started looking at how we needed to transform ourselves across the enterprise of manpower personnel training and education. Again, another long overdue thing.

You wouldn't have built my organization the way it is if you had started with a blank piece of paper. Consolidations, BRAC, all those are things that made us the way that we are. But given the state of play, what can you do with what we have?

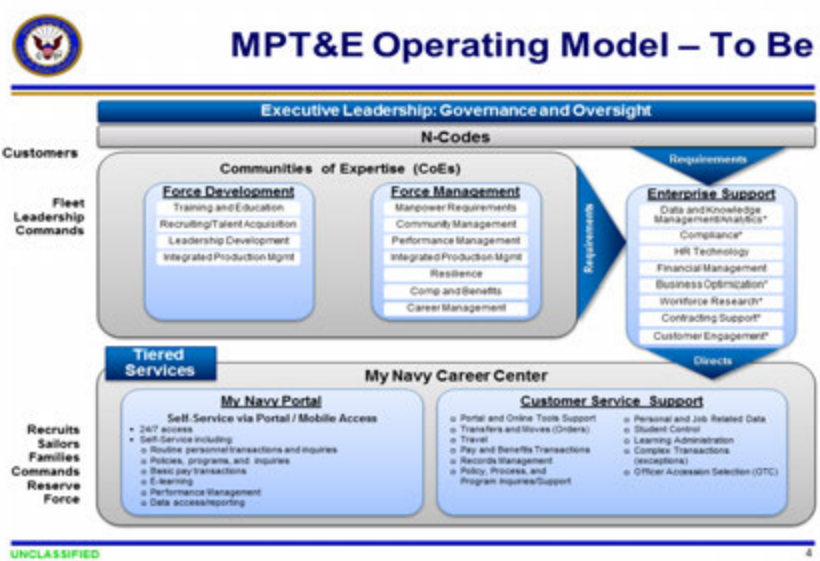
So we started with processes. We leaned in with these. We looked at how it all broke out and we tried to put it back together again in a logical way.

We took processes that were 53 signatures and took six to nine months for a sailor to get an answer. We found out that 46 of them were no value added. We got rid of them.

We found that some of the underlying requirements dated back to 1793. The assumptions were no longer valid, and we got rid of them. It's the personnel world, trust me. Some of them go back that far.

When we laid it all back together again this is how it came out. Force development was one of our critical lines of business. I use the term lines

of business, and we think of our sailors as customers, because we want to become a customer service-oriented organization.



Force development is what we're talking about, everything involved to get a person off of the street, turn them into a sailor -- which I include officers as sailors – and get them to their first operational assignment. So the commander of Naval Education Training Command, one of my two-stars, is now also the deputy chief of naval personnel for force development. He has CHOKECON, as I affectionately refer to it, for everything under that business line: recruiting, recruit training, and all the officer ascension sources except for the Academy, which I don't own but we coordinate with; and then all of the training commands and even the detailers to get folks to that first assignment, which is radically different than the way it was before. We found lots of efficiencies by looking at everything under that one umbrella, soup to nuts, instead of the individual fiefdoms. Again, I think any company would have done it this way, it's just taken us a while to start looking at it kind of in business lines like this.

Force management, we're putting NPC and BUPERS back together again as BUPERS and simplifying it and we've broken up all of the little fiefdoms of information technology and things that were at the individu-

al commands and centralized those. Things like information technology where all the money was locally controlled, and that's how I end up with 55 families of systems, 252 different IP systems, no two of which talk to each other. It has really caused me a lot of problems.

We're done with that. The organizational change stuff is in process right now. But our operating model and way sailors are going to interface with us is also going to radically change here over the course of 2018.

We're kind of using the USAA business model. The main interface will be sort of a tiered customer service input: 2.0 will be through the Internet or their smart phone, and it will be via a portal we call 980 portal. That's operational now. We have a low bandwidth version that ships can access. In six months we'll have a smart phone path that they can get to it.

Everything that they do at Personnel Support Detachment today, they'll be able to do via 980 portal. If they have a child or they get married, they'll take a picture of the birth certificate or the marriage certificate and they'll upload it just like depositing a check at a bank today. Their pay will be automatically corrected, and it will be right the first time because we're not going to have to fat finger it between five different systems and manually re-enter it like we do today, which is very error prone and which is what causes all the problems that we have today. It's just going to be done right the first time because the backbone of all this now is one single integrated commercial off the shelf pay and personnel system, which went live for testing on August 1st up at Great Lakes where we're starting new personnel records.

We're expanding that out over the course of 2018. Tier 2 will be our call center, which we're going to call 980 Career Center. That will stand up about June of 2018 and it will be very much like, again, USAA. You'll call, you'll get a very knowledgeable customer service representative, and then that will bump up to different levels of expertise as you go.

So by the middle of 2019 most of the services that you think of at a PSD will be gone and we'll be able to accelerate the closure of those services and markedly improve the service for our sailors. So, 2018, I think, is going to be a year of big changes for how our sailors do business with my organizations, and I'm really looking forward to showing it to them.

I think I've gone over my time limit. I really appreciate the opportunity to speak here today. I appreciate the opportunity to show you what we're doing and give me the opportunity to talk about what we're doing for our sailors.

So with that, I think we have a few minutes for some questions. Thank you for your time.

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UNITED STATES SUBMARINE FORCE: GETTING FASTER

FORCM (SS) JOHN PERRYMAN, USN
COMMANDER, SUBMARINE FORCES
U.S. ATLANTIC FLEET

Thank you, Admiral, for the kind introduction and the opportunity to speak to such a distinguished group of submarine supporters. Yesterday my boss, Admiral Tofalo, discussed with you the many challenges facing our force today and the exciting efforts underway to meet those challenges. You also heard from Admiral Caudle, who detailed for you the competition our submarines face and the success of our crews on deployment. My counterpart, FORCE Davenport will provide an update, after I speak on the programmatic things, that he and I are working on. I wanted to spend my time today highlighting the exceptional Sailors who have made our success possible.

Our submarine force consists of 20,000 dedicated professionals from all over the country. This generation of Submariners possess an exceptionally positive, constructive commitment to our mission. The overwhelming majority of our Sailors have joined during the longest war in our country's history and they're in submarines because they want to be. Day in and day out, they serve with an unparalleled devotion to our core values of Honor, Courage, and Commitment.

We are proud that even in today's improving economy, the majority of our Sailors and their families decide to "Stay Navy." They KNOW what they do every day matters, and that they and their families willingness to continue to serve highlights just how resolute they are. Not only are they choosing to continue to serve, they are also much better citizens than any past generation. This is clearly evident when you see the decrease in our attrition and destructive behavior numbers. In the last ten years, we have seen a 70% drop in our attrition rate, a nearly 60% reduction in DUIs since 2009, a 50% reduction in family maltreatment since 2013, and a 40% reduction in sexual assaults since 2015.

While I am not ready to claim victory, I am confident we will continue to see improvement in these areas, not only because of the programmatic changes we have made but because we continue to recruit and retain the very best our nation has to offer. And the American people know it. The June 2017 Gallup Poll showed the American people hold the U.S. military community in the highest confidence out of 14 major US institutions.

As Admirals Tofalo and Caudle demonstrated in their remarks, nearly 25% of our force is forward deployed at any given moment in support of national objectives. We are on scene, unseen and doing it with the fewest number of submarines since the early 1900s with submarines that, on average, are 23 years old. Our amazing success is only possible because of the efforts of our Sailors.

Sailors like:

Machinist Mate Auxiliary 1st Class Brandon Fowler from Juliette Georgia. Petty Officer Fowler joined the Navy in 2008 and is currently serving aboard the USS *Florida* where they recently completed the largest availability in Trident Refit Facility history. When asked why he likes being a submariner he stated "Because I get to be the technical expert on 80% of the systems on a submarine"; and man is he ever. Through his leadership in his division and throughout the ship as Assistant Quality Assurance Officer he enabled the successful completion of over 750 retests of vital ship systems; repairs to the Emergency Main Ballast Blow system and the successful rebuilding of 5 hydraulic accumulators in the past year.

Also from USS *Florida*, STS3 Kristopher Stahlman is from Pago Pago, America Samoa and joined the Navy in 2013. He is qualified Advanced Sonar Operator and was the ship's go-to mentor and trainer for newly reporting Sailors in their qualifications and transition to life aboard the submarine.

Fire Control Technician 1st Class Joseph Hardy from Fort Worth, Texas is currently aboard the USS *Missouri* where he is qualified PILOT and serves as the Leading Petty Officer of his division AND the Command Career Counselor. His leadership and expertise were instrumental in getting his division ready for TWO European Command deployments and in the ship's receipt of the Retention Excellence Award for 2017.

Electronics Technician Navigation 2nd Class Tyler LaGrange is from Dumont, New Jersey and also serving aboard USS *Missouri*. Although he is on his first boat, he is already qualified Navigation Supervisor and Duty Chief Petty Officer. He is a stand out watch stander whose technical acumen and mentoring of junior Sailors directly contributed to his boat receiving the Navigation "N" award for two consecutive years. His favorite job on the submarine is to rig the bridge right after surfacing where he says "You get to see the sunlight or stars, smell the sea air, and nothing but ocean all around you." Anyone who has ever spent time in a bridge underway knows exactly what he is talking about.

I would be remiss if I did not also highlight the tremendous work of some of our Submarine Force Reserve Component Sailors who fill critical roles in the success of our force.

Hull Technician 1st Class Jose De La Cruz Ramirez from Gaithersburg Maryland is a single father of twin five year old daughters who transferred into our reserve force in 2008. Since joining the SFRC, he not only utilized his Navy rating skills in support of fleet maintenance onboard both the USS *Frank Cable* and USS *Emory S. Land*, he also utilized his civilian IT skills. Most notably during a recent active training period he worked in the N6 department at SUBLANT writing scripts and helping with programming that will save the department over 2000 work hours a year.

Another great reserve Sailor is Logistics Specialist 2nd Class Josiah Rowell from Silverdale Washington who supports our strategic mission as a Force Protection specialist. As a member of Submarine Group 9 Force Protection Detachment 1, he manages the unit's supply department and trained fellow Sailors in force protection procedures creating a high state of readiness for his unit. His efforts resulted in his selection as Navy Operational Support Center Kitsap's Junior Sailor of the Year.

The Sailors I highlighted for you today are NOT the exception. As I travel around our Force, talk to our Sailors and see them in action, I can assure you there are roughly 20,000 more JUST LIKE THEM. I am humbled every day by their selfless service to our country and am thankful for the opportunity to serve as their Force Master Chief. (And frankly, as an aside, I'm glad I won't have to compete with them for promotion.)

Before I close, I would also like to acknowledge the support provided by our families. We are the dominant expeditionary force because they take care of our homes. I learned from being born and raised in a military family and continuing now as a spouse and parent, the resiliency and support we enjoy from our families is the secret ingredient in our Navy's success. Their sacrifice for our country is as real as any service member's, and I am thankful they are willing to serve in such a challenging and important capacity

Thank you for the opportunity to speak to you today and for your continued support of our Sailors and their families, and I will now turn it over to FORCE Davenport.

NAVAL SUBMARINE LEAGUE
35TH ANNUAL SYMPOSIUM

UNITED STATES SUBMARINE FORCE: GETTING FASTER

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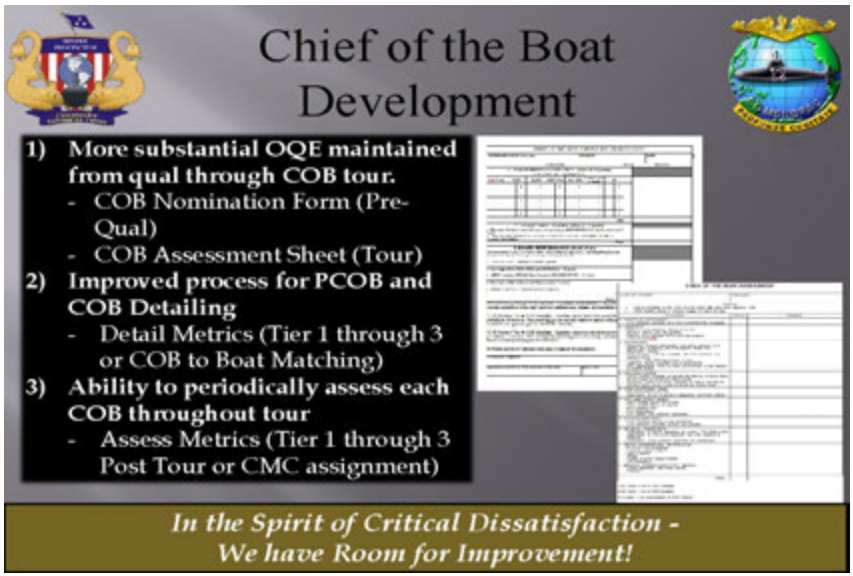
Good afternoon Admirals, Retired Admirals, Captains and retired Captains, I am Force Master Chief Paul Davenport. It is an honor to have the opportunity to share with you all some highlights from combined efforts of SUBLANT and SUBPAC to meet the expectations of our Navy's Design for Maintaining Maritime Superiority and our Leadership Development Framework. In keeping with this year's theme, we are dedicated to Strengthening our Navy Team for the Future and enhancing our war-fighting and operational competence as well as developing Sailors with strong character and Getting Results Faster.

I'll be providing an overview of improvements to our COB devel-

opment process and the Hugh McCracken Award. Each of these efforts to positively affect policy will without a doubt strengthen our culture of critical self-assessment and striving to become the best leaders we can be in order to precisely guide and develop our 21St Century Sailors. Additionally, I will be highlighting some of our submarines, ships and personnel that have been working their rear-ends off in defense of freedom and democracy across the globe.



At the beginning of FY 17, we looked at COB qualifications through a microscope following a few detachments for cause and early reliefs of a few of our COBs. In the spirit of "Critical Dissatisfaction", we identified that while the process was thorough, we still had room for improvement. In the past we did not have any measures in place to make a clear objective assessment of where to best place our prospective COBs. In most cases we would qualify a Sailor, in some cases late, and just prior to their planned rotation date. Then we relied on a Squadron CMC to identify what boat they would be stationed on for their COB tour. This prevented us from aligning skill sets with boat performance and in some cases drove just in time detailing. Through our new process we have established objective quality evidence.

We now assign a Tier number (1 thru 3) to our prospective COBs. The score that they receive on the COB nomination grading sheet is 75 percent objective and 25 percent is subjective based on their performance in the COB board. We then take the Tier number and align them to a boat to achieve the best fit. We maintain track of our boat and crew performance through Squadron assessments, external inspections (TRE/ORSE/SMI) and people centered-metrics. The Squadron CMCs and Force Master Chiefs evaluate the best placement for our prospective COBs by aligning the tier number of the Sailor to the boat. For instance, we will never place a tier 2 COB on a tier 3 boat, but we would most certainly take a Tier 1 candidate and place him or her on a Tier 3 boat (One that is struggling to deliver results).

Not only have our recent changes allowed us to set our boat crews and COBs up for success, it brings more visibility to our detailing process for Sailors seeking COB qualifications, and lastly allows us to get left of the problem. Another important factor is we force assignment more than 9 months out, no more just-in-time detailing. What we have found is that due to all these efforts, more visibility and fairness, we are able to build a deeper bench of prospective COBs and to date we have not had to assign any Tier 3 COBs to any boat. In fact, we can send our Tier 3 COBs back to sea to gain more experience. When a Sailor completes this new qualification standard they clearly understand where they stack up in comparison to their peers and it clearly identifies their strengths and weaknesses.

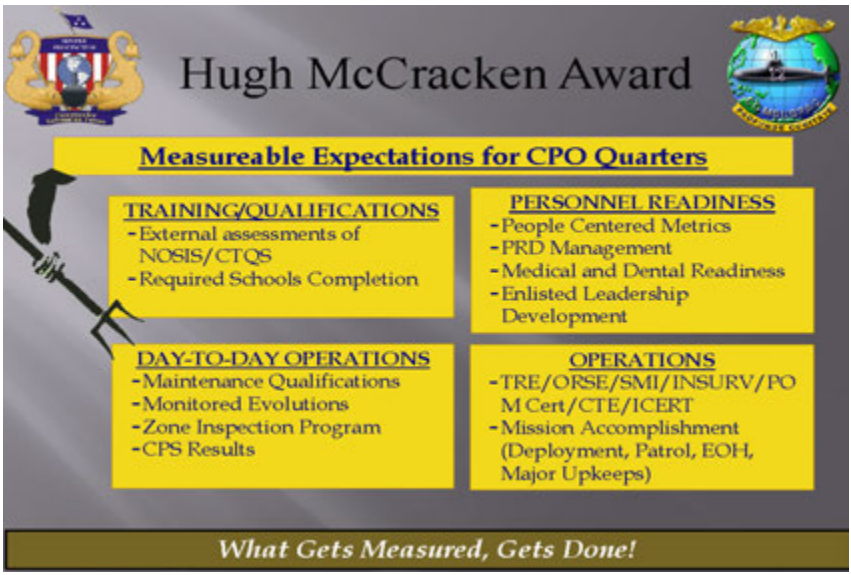
Once we had a solid process in place for COB detailing, we then expanded our ability to critically assess serving COBs with the same approach to establishing objective quality evidence. We had identified instances where COBs had hit the ground running and kept crews and boats at a high standard of performance, but in their final year they sometimes would become too comfortable and performance and productivity would decline. We also identified that we weren't able to provide clear assessment factors for future assignment as a CMC.

Now, 18 to 24 months into their COB tour, we assess them in 10 critical areas of performance. This assessment tool is provided to their Commanding Officers and Commodores, then the CMC routes the assessment to the Force Master Chiefs. This assessment is used to stack

and rack our serving COBs. Tier 1 and 2 COBs are identified for future assignment as Command Master Chiefs and Tier 3 COBs are provided a post tour COB assignment or they may be returned to their source rate detailer. A great by-product of this assessment and detailing process has given the submarine force Sailors a clear understanding of the Senior Enlisted Career path.

Force Perryman and I have set our sights on developing our COBs to not only feed the submarine CMC assignments, but to also support the high demand of the Surface and Air communities. The submarine force has 101 COB billets. On average we rotate 30 COBs a year and between our 44 9580 (CMC) billets and 27 9579 (post tour COB) billets we only require 16 to 20 of these post tour COBs in submarine force billets. This permits us the ability to release numerous COBs to fill demanding a critical CMC billets in the surface and air communities.

We are working diligently with our great, well trained Senior Enlisted Submariners to bring much needed attention to all the awesome opportunities in our Navy to serve in great commands outside the Submarine Force. We've crunched the numbers and on average our COBs report to their COB tour around their 19th year of service, which supports them serving as a CMC for 8 years or more. Our overall message



to our Senior Enlisted is your Chief of the Boat tour is a milestone that all great leaders should strive to achieve. We have and will continue to produce top leaders in our Navy and we are pushing harder than ever to spread this wealth of knowledge and experience throughout our Navy and joint forces assignments.

Now we transition from developing a stronger Leader that leads the Chiefs Quarters to developing a set of standards that challenges our Chief Petty Officers to become the best at producing the best Sailors.

Separate from our Guiding Principles, we have never had a published set of metrics to measure what it takes to become a high functioning Chiefs Mess. We identified key areas that we demand our Chiefs to focus on as they develop their Sailors and lead their divisions. The first and most essential area is Training/Qualifications. This includes reviewing qualification and proficiency of watchstations, training exams and oral interviews throughout the year, percentages for completion of required schools, both shipboard requirements and NEC specific schools. The second is Day-to-Day Operations. This is where we evaluate the overall effectiveness in maintaining maintenance qualifications (craftsmen, QA workers, QAIs and QASs), monitored Evolutions conducted by external organizations, and finally something that is near and dear to a Chief of the Boat's heart, the execution and effectiveness of the Zone Inspection Program, cleanliness, preservation and stowage results. The third category we evaluate is Personnel Readiness. We are able to evaluate this on a monthly basis through people centered metrics, which clearly tell us what the Sailors are doing and how the Chiefs are delivering with respect to unplanned losses, qualifications, reenlistment rates and advancement percentages. We also review PRD Management, Medical and Dental Readiness, Enlisted Leadership Development (Percentage of First Class Petty Officers and Chiefs qualified DOOW, ANAV, and percentage of Chiefs/Senior Chiefs qualified EDMC and COB). The last attribute that we evaluate for determining which command is the best of the mess is, Operational Success, such as TRE/ORSE/SMI/INSURV/POM Eval/CTE/ICERT, Mission Accomplishment (Deployment, Patrols, Shipyard Availabilities and Major Upkeep Periods).

After our Submarine Squadrons stacked and racked their individual units, FORCM Perryman and I chaired a selection board and on behalf

of Vice Admiral Tofalo and Rear Admiral Caudle, we are proud to announce our inaugural year's winners.

Representing COMSUBLANT, and Squadron Twelve, USS *New Mexico*. Commanded by Commander REISS with Lieutenant Commanders GARNER and MARTINEZ as Executive Officers and Chief of the boat, Master Chief CLARKE.

Representing COMSUBPAC, and Squadron Seventeen, USS *Alabama* (BLUE). Commanded by Commander REINHART, and Lieutenant Commander Low and Latta as Executive Officers and Chief of the Boat Master Chief LEONARD.

THE FOLLOWING COMMANDS WERE RECOGNIZED AS THE BEST OF THE BEST IN THEIR RESPECTIVE SUBMARINE SQUADRONS:

Squadron Four: USS *Minnesota*, Squadron Six USS *Helena*, Squadron Sixteen USS *Georgia* (GOLD), Squadron Twenty USS *West Virginia* (BLUE), Squadron One USS *Mississippi*, Devron Five USS *Jimmy Carter*, Squadron Seven USS *Louisville*, Squadron Eleven USS *Pasadena*, Squadron Fifteen USS *Key West*, and Squadron Nineteen USS *Michigan* (BLUE).

We are confident that the recognition will spawn a culture that brings continued SUCCESS, DRIVES MISSION READINESS, AND ENABLES crews to become stronger. After this year's results, we are also reassured that our force is aligned and pushing to excel in all areas critical to war fighting and operational competence and building stronger character in our Sailors.

Now I would like to take you on a quick tour around the Pacific Fleet.

Our first stop is PACNORWEST, where we find an armada of lethal submarines. Nowhere else in our Navy will you ever find more fire power in one homeport. Not only do we have 16 crews operating the world's deterrent to nuclear conflict in our eight SSBNs, you will also find our two great ships that bring a much needed presence in the SEVENTHFLT AOR, our Forward Deployed SSGNs, and then lastly we have three rare submarines built to win the Cold War in our Seawolf Class.

In October Commander Melvin Smith turned over the reins of the Seawolf-class fast attack submarine USS *Jimmy Carter* (SSN 23) to Commander Keith Floyd just 3 weeks after returning from their recent deployment.

As our Submarine Force Commanders have previously stated, Development Squadron Five has done a superb job keeping *Jimmy Carter*, *Connecticut* and *Seawolf* at a high state of readiness. Soon we will have all three of these boats operational as *Connecticut* is marching along in our Fleet Readiness Training Period and then at the first of the year, in January, we will get *Seawolf* out on sea trials.

This past year, the Ohio-class ballistic-missile submarine USS *Nebraska* completed sea trials and returned to service due to the great

work that our shipyards continue to provide. The crew was excited to get this great ship back in service following an extended engineering refueling overhaul.

Another one of our eight ballistic missile submarines in the Pacific Northwest that provides us our most survivable leg of the strategic triad, USS *Alabama* crews completed multiple strategic deterrent patrols. Chief Electronics Technician Goodwin, assigned to the Blue crew was welcomed home by his family following one of those strategic deterrent patrols. And as you recall in my earlier slides this ship reached and maintained high standards obtaining the title of the best Chiefs' Quarters in the Pacific.

In January 2017 *Michigan* deployed for the Western Pacific and remains a ready forward deployed asset. I had the pleasure of riding the

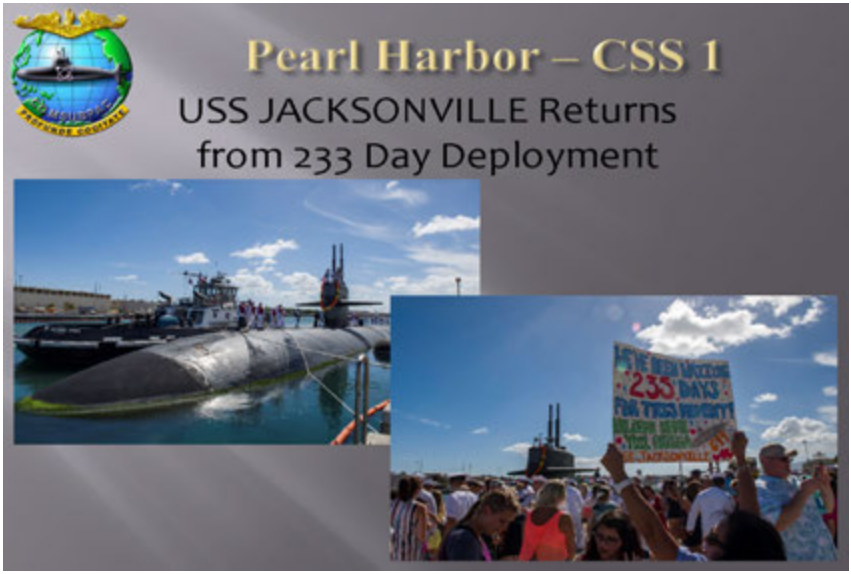
boat when CAPT Turk's BLUE crew took the boat for the first time in theatre following extensive repairs in the shipyard. In March I watched a very talented crew, highly motivated with a strong sense of pride and positive culture throughout. The deployment in the spring was historical, in that we had come full circle with our integration of females in submarines. I was simply amazed as I witnessed young first term female submariners lock step with the men. Between the *Michigan* Blue and Gold crew, we had 54 junior enlisted and six senior enlisted women into the force. The strong leadership onboard *Michigan* ensured the smooth transition of each Sailor into a professional environment. *Michigan's* enlisted women earned 24 sets of silver dolphins and qualified over 100 at sea and in-port watches.

During a period of escalating world tensions, *Michigan* was called upon to participate in Theater Security to improve regional stability and build upon our strong partnership with South Korea and the Republic of Korea Navy.

Now we transition from the Great PACNORWEST to this century's

Submarine Capitol of the World, Pearl Harbor.

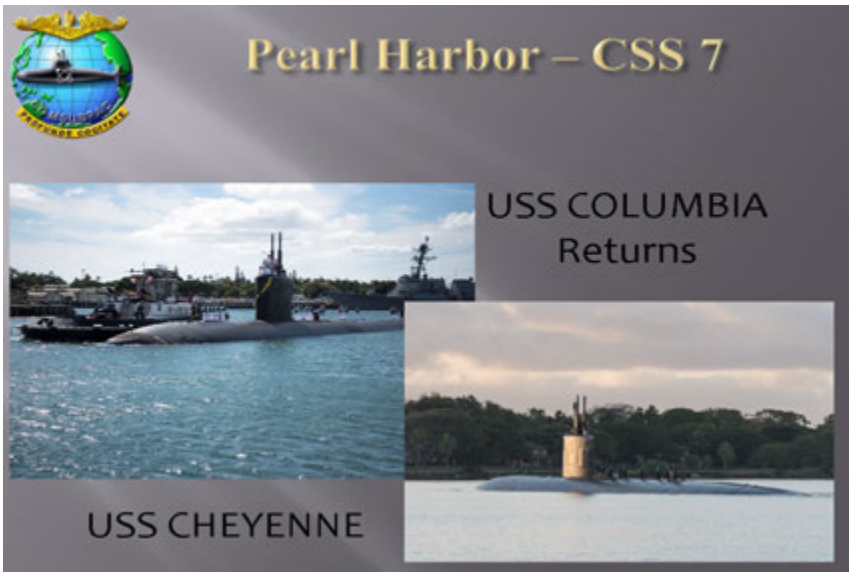
On the 10th of Aug, family and friends would welcome home their



Sailors assigned to Los Angeles-class attack submarine USS *Jacksonville* (SSN 699) during its homecoming arrival at Joint Base Pearl Harbor-Hickam, after completing its final deployment of EIGHT MONTHS. Not bad for a submarine commissioned on May 16, 1981. The boat provided superior Theatre presence in the 5th Fleet area of operations and Indian Ocean. One of the joys of this job, is being able to welcome our boats back from deployment and I'll never forget standing there with the families as *Jacksonville* pulled in. The sights, sounds and emotions that flow through the submariner soul during these reunions is truly inspiring.

Another great old classic, boat USS *Bremerton* SSN-698 (BAD FISH) just departed for the ships final Deployment/WESTPAC. *Bremerton* was launched July 1978 and commissioned March 1981. It is unbelievable what we can accomplish with these great submarines. And going back to what Force Perryman stated, it's all due to this awesome generation that is joining our Navy and volunteering for our service. Without these Sailors, our Navy's Submarines, Ships and Aircraft life's blood are nothing but hard cold steel. Our Sailors are truly our Secret Sauce.

Another Squadron One boat would bring the ARLEIGH BURKE FLEET TROPHY back to their squadron for the second year in a row. That's right 688 fans, which I can confidently say I am after serving on 5 of them, back to back years where a Virginia Class submarine has won this prestigious award. USS *Mississippi* recently was presented their trophy by Admiral Swift just prior to departing for the ships second deployment. Oh, another interesting fact about *Mississippi*, a certain Force Master Chief has a son reporting aboard in a week as a Communications Electronics Technician. Clearly, he received an extra dose of intelligence from his mother because he didn't grow up to be a Torpedoman like his dad.



Squadron Seven relieved Squadron One this past year deploying the most submarines of any Squadron, in fact they had five boats in theatre at one time. USS *Cheyenne* and USS *Columbia* were two boats that returned last fall from highly successful deployments. Speaking of *Columbia*, they're certainly well represented by our Frank A. Lister Award winner, Master Chief Torres.

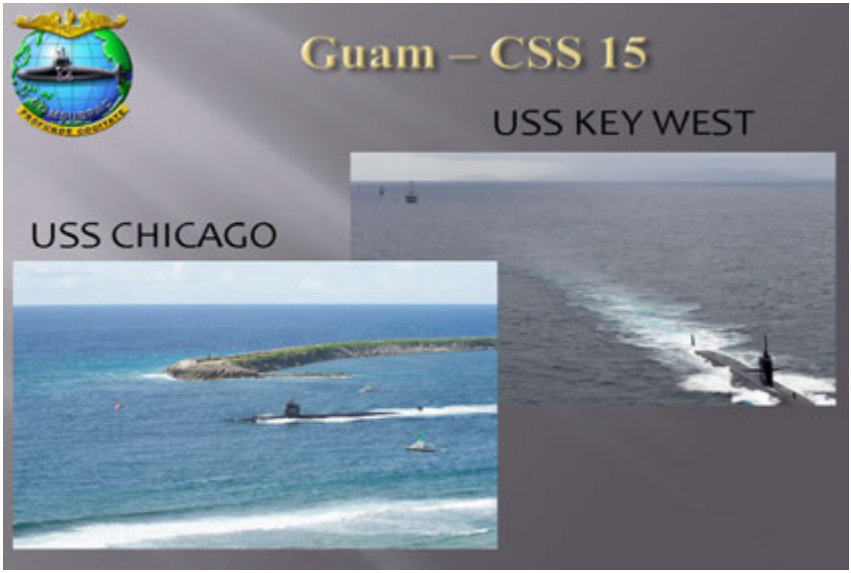
Guam continues to be a top priority for Admiral Caudle and me as we look at expanding our footprint to five SSNs. Our strongest assets

that will clearly allow for this build-up in Guam are our Submarine Tenders and the Sailors and MSC personnel that make up these great ships.

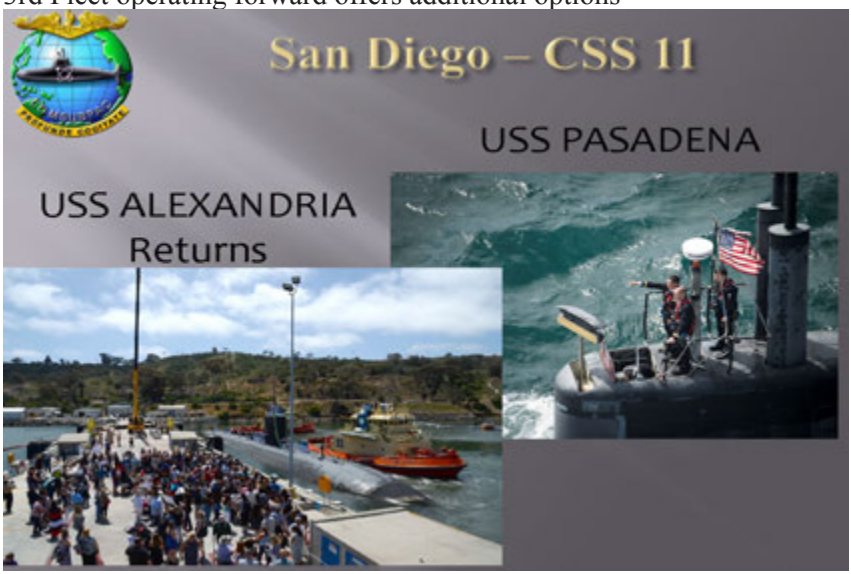
One of those Tenders that have been the work horse this year keeping the homeported submarines, *Michigan* and all our SEVETHFLT deployers from Pearl and San Diego operationally ready, USS *Emory S. Land* has answered the call time and time again. The last four upkeep periods have been completed on time improving upon our readiness of our Forward Deployed Naval Forces.

Another priority for us is to utilize our Tenders as an expeditionary logistics force and in March prior to *Frank Cable* going into a civilian shipyard in Oregon, we tested this mission in MAJURO, Republic of the Marshall Islands. *Frank Cable's* Weapons Department, Navy Cargo Handling Battalion 1, Commander, Task Force 75 and USS *Pasadena* completed a demonstration exercise of submarine expeditionary logistics by shipping a training shape on and off the submarine.

In May of this year, USS *Key West*, the Arleigh Burke-class guided-missile destroyer USS *Sterett*, and the Royal Thai Navy frigate HTMS *Naresuan* and the corvette HTMS *Long Lom* conducted a transit exercise as part of Exercise Guardian Sea 2017. *Sterett* is part of the Sterett-



Dewey Surface Action Group and is the third deploying group operating under the command and control construct called 3rd Fleet Forward. U.S. 3rd Fleet operating forward offers additional options



to the Pacific Fleet commander by leveraging the capabilities of 3rd and 7th Fleets.

About 2 months ago USS *Chicago* departed Apra Harbor for the last time as a homeported Guam unit. *Chicago* successfully completed an Operational Reactor Safeguards Examination during the ship's transit from Guam to Pearl to fully recertify the crew and the ship. She will undergo a shipyard availability and we expect this ship back in theatre on deployment in 18 months.

In May, USS *Alexandria* returned to Naval Base Point Loma following a 6+ month extended deployment to SEVENTHFLT Theatre. This was the ship's first deployment following her engineering refueling and overhaul in Portsmouth, New Hampshire. And I would be remiss if I did not compliment the great work that this shipyard completes. While I was the Command Master Chief at Squadron Eleven, I was always impressed by the detail and quality of work, but never had I seen more pristine boats in my career. Now I've been onboard *Alexandria*, *Scranton* and *Annapolis* and they are all in top material condition.

In September USS *Pasadena* also completed a 6+ month extended deployment. Lt Martinez and LT James drive the boat on the surface inbound to Naval Base Point Loma returning from deployment. USS *Pasadena* also participated in the second annual Los Angeles Fleet Week this past September.

That concludes my brief. Thank you again for inviting me to this wonderful event. God Bless the United States of America and our great Submarine Force.

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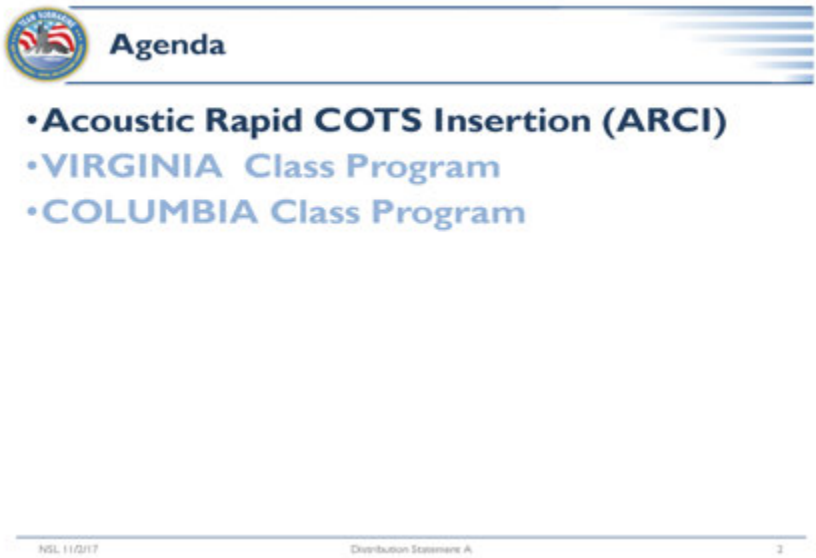
REAR ADMIRAL MICHAEL JABALEY, USN
PROGRAM EXECUTIVE OFFICER SUBMARINES

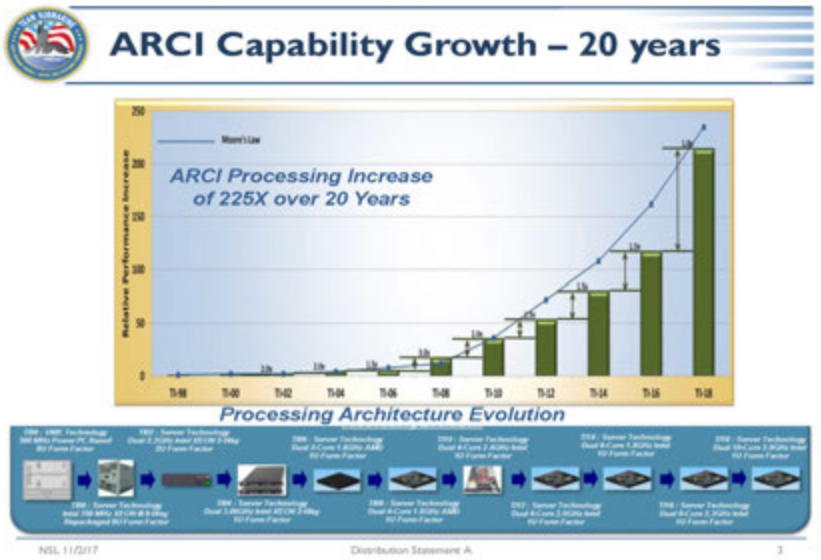
Thank you very much. I greatly appreciate the opportunity to address you today. What I'm going to do is walk through three sections of my portfolio.



I'm going to start with acoustic rapid COTS insertion. The reason I'm doing this is partly to recognize that yesterday was an important date, because on November 1, 1997, 20 years ago yesterday, we delivered the first ship set of ARCI equipment and installed it on USS *Augusta* (SSN-710). Of course, neither that equipment nor the *Augusta* are with us anymore, sadly, but it really started a revolution in the way we provide combat system electronics.

The first ship set was a single work station, a single processor, single

server, and it provided towed array processing for the TB-23 thin line array. Phase two added a second work station and the ability for dual array processing, both the fat line and the thin line, TB-16 and then TB-23 and then later the TB-29. Phase two also brought in the hull arrays. Phase three brought in the spherical array, and phase four brought in the high frequency sail array. All of that commercial off the shelf electronics equipment to process existing arrays.



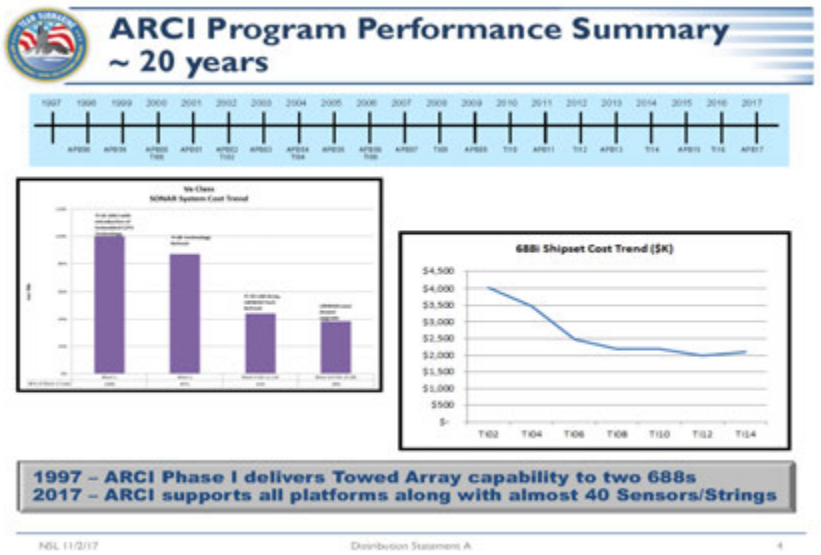
After that, we moved on to the TI-APB process and that really has been foundational to the success of our submarine force over the last 20 years in reaping the benefit of the tremendous advances in electronics. This graph shows the curve of Moore's law, and the green bars show the processing increase over the last 20 years. From the early days of ARCI to today, we have increased processing capability over 225 times. So, 225 times the capability that we had 20 years ago.

This slide shows hardware. It shows processing capability and it shows – the print is pretty small – but along the bottom line it shows processor speed and server space. What took us eight units of rack space in the early days is now less than one unit, and the processing, again, is 225 times what it was originally. At the same time, we have developed

software increases.

We do have very detailed metrics that we use to analyze the benefit of the software we provide in solving the fire control solution. It's not only "is the processing good enough," but are the algorithms, the human-machine interface, the displays, the functionality, and the ability for a sailor who has been through a fairly limited amount of training, to sit down and quickly adapt himself or herself to the system that they're using and generate the desired results? The way we do that is classified, but it deals with things like if there is a threat contact out there, can you detect it? Can you discern it from the information displayed on your sonar screen?

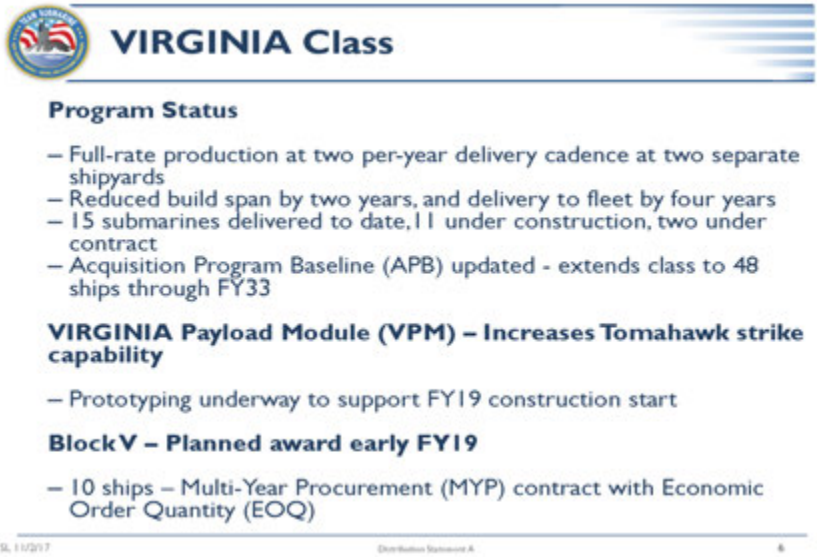
If you are holding a contact, can you develop a fire control solution and how accurate is it? If you have a contact, how long can you hold that contact? All of that is a function of not only the training of the operators, but the ability and capability that we provide to help the operator do their job.



And during this process we've also taken advantage of the unique aspects of electronic systems, in that the cost comes down as the capability goes up. That chart on the lower right, ship set cost is in then-year

dollars. So not even adjusted for inflation, and we've had absolutely real cost drops for more capable equipment over the years. In fact, electronics is the one area where you should never award a firm fixed price contract, because if you do over a period of time you will miss out on cost savings.

In recognition of the 20th anniversary of ARCI being yesterday, I wanted to give you a sense of how far we have come in those 20 years. Let's move on to the Virginia-class program. The Virginia-class program is in great shape.



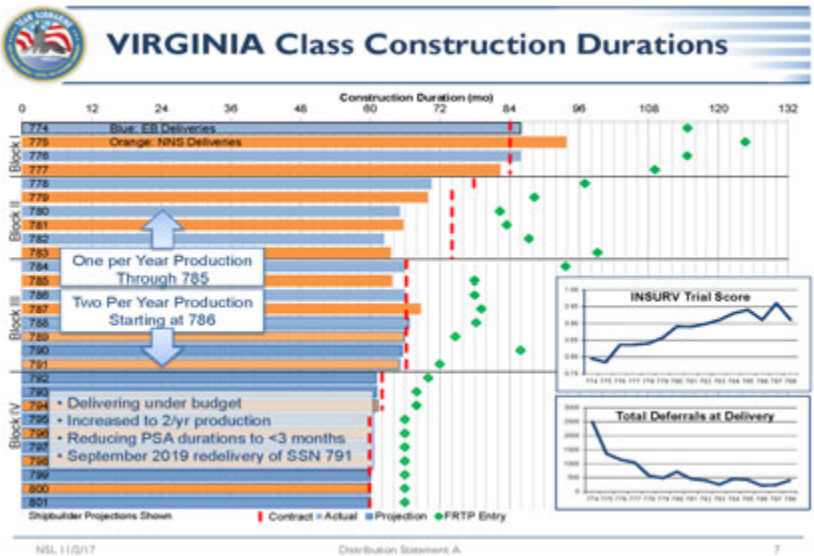
We are absolutely at two per year delivery. Jay Donnelly was saying, in my four years as program manager I delivered four submarines. That is below the standard now. A four-year program manager will be expected to deliver eight submarines from now on, and he will.

Two per year delivery cadence, one each out of Electric Boat and Newport News, at the current pace. In doing so, we have significantly reduced the contracted build span for each of the submarines and significantly reduced the amount of time that it takes to turn the ship over to the fleet. Admiral Johnson mentioned that on the slide, and I'll talk a little bit more about it.

Fifteen submarines delivered to date, 11 more under construction,

two more after that under contract that will start over the next year. Since the last time I addressed this group, we approved an extension to the acquisition program baseline, or APB, that took us from a 30-ship class which was the original intent of Virginia, to 48 ships. By the current shipbuilding program of record, that will take us through fiscal year '33, however I expect that we'll hit 48 total well before that. Then we'll make the decision, do we extend the APB again or will it be time to move on to a future submarine design?

The Virginia Payload Module is progressing well. We are technologically ready to install that on the second ship in the block 5 contract, the second ship of fiscal year '19. Block 5 will be a 10-ship contract from fiscal years '19 through '23. We'll build two of the submarines every year.



This is the chart that Admiral Johnson showed. The way you look at this chart, the blue lines are Electric Boat and the orange lines are Newport News. The green diamond is when the boat is redelivered out of post-shakedown availability and we actually turn the keys over to the type commander for him to train and provide that as a deployable asset to the combatant commanders.

There are two things that you want to look at here. The original con-

tract span of 84 months has been reduced down to 60 months for the last eight ships of the block 4 contract. That is a two-year reduction, from seven years to five years, in our agreement with the shipbuilders on how long it is going to take to build these submarines.

The green diamonds, from the very early days, our longest one way out here to the current green diamonds and projected green diamonds, is a four-year reduction in how long it takes to deliver the ship, get it back into PSA and out of PSA and to the type commander. That's a tremendous improvement in how quickly we can get these boats into their hands. That's critically important. As I'll show you in a minute, we still have a trough that we're facing, and one of the ways to mitigate the impacts of that trough is to get the boats to the fleet faster.

The task that I have set for Captain Mike Stevens, which he has agreed to execute, is that on these boats, starting with this one which is the 791, the Delaware, the last ship of block 3, the goal is to deliver the ship and then within six months complete PSA. We're aiming for a three month post-delivery testing period where we do acoustic trials, weapons system accuracy tests, and then bring her back in for a three month PSA and get it to the type commander in six months. The reason we can do that is because of these two trends.

Quality of delivery, the top graph is the INSURV trial score. Our last six boats have all been above 0.9. The bottom one is total deferrals at delivery. What are the things that we couldn't finish that we recognize were not important enough to hold up the ship from being delivered, so we process a waiver or deferral request (WDR) and defer it to PSA. You can see a tremendous advance in reducing those numbers, which goes into the work scope at PSA. So, the fewer WDRs we have, the less work there is to do in PSA and the more confident we are that we can turn that boat around back to the fleet in less than six months.

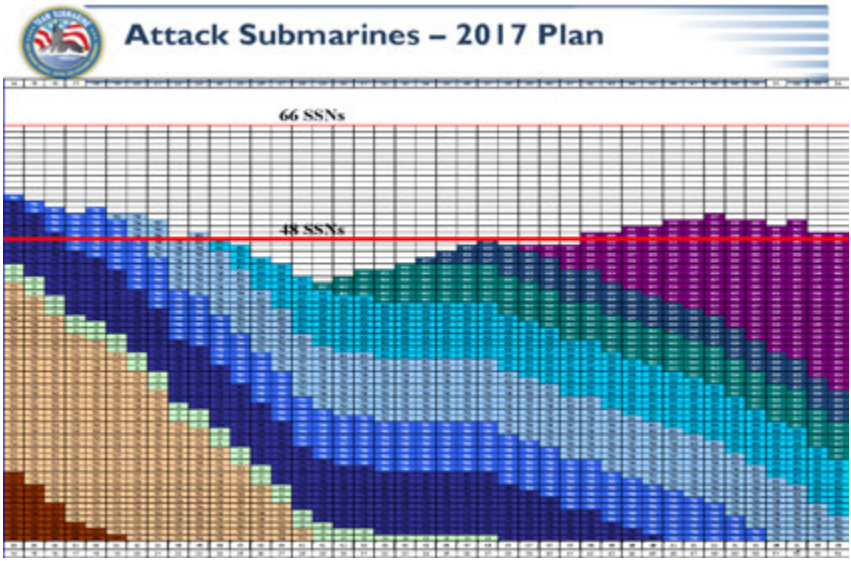
Virginia Payload Module, this is quickly becoming a reality. The Virginia payload tube is a similar design to the Columbia missile tube with some very key differences. Both the Columbia missile tube and the Virginia payload tube have an integrated tube and hull assembly at the top where it fits into the ship's hull. The Virginia payload tube also has an integrated tube and keel assembly, as opposed to the missile tube on Columbia, which is just the end of a cylinder welded to the hull.

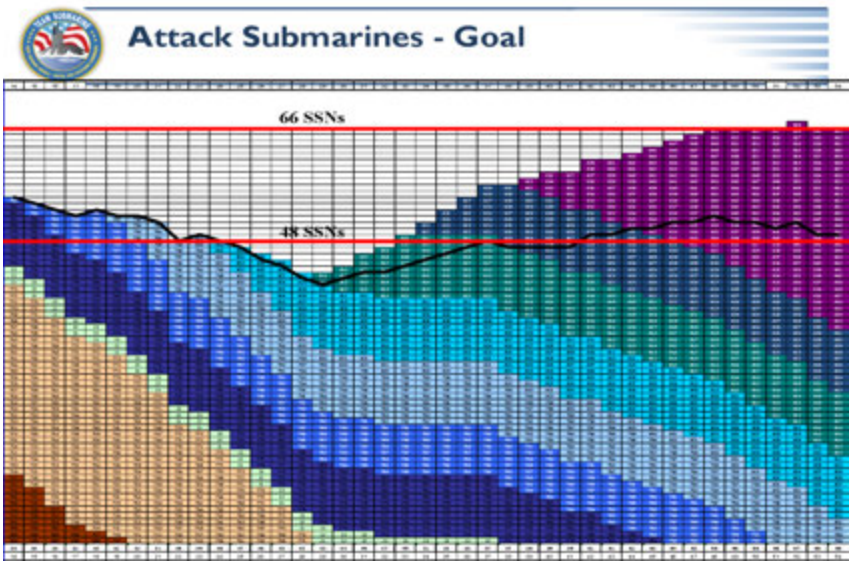
So many similar things, and that led us to the effort of continuous production of missile tubes. We took a holistic view and said, for all of the tubes we're building for the Columbia-class, plus all of the tubes that the UK is building for the Dreadnought-class, plus all of the tubes on Virginia, both the payload tubes in the bow and the four payload tubes in the Virginia Payload Module, we have to figure out a way for the shipbuilders to do this smartly, efficiently and with savings. We did that through continuous production under specific legislative authority from Congress. We have pulled work to the left to more smoothly ramp up the requirement for the vendors that provide the components for the tubes with the key producers, BWXT, BAE Systems, Babcock Marine and Northrop Grumman, through their subcontractor PCC, actually producing the tubes and then sending them to Electric Boat and Newport News for them to be outfitted and installed in ships.

I showed you this last year, and this is what we call the chicklet chart. The 48 SSN requirement, that's old news. Under the force structure assessment released in December of last year, the attack submarine requirement is now 66 SSNS. So, we used to talk about this trough, now we're talking about this trough.

Obviously, you can't snap your fingers and make that go away. But,

what we can do is recognize that, as Admiral Johnson said, if you want 66 submarines and they last for 33 years each, then you have to build two every year forever to reach and maintain 66 attack submarines. So, in the





current plan, if you build two submarines every year you get this profile, and then you reach 66 submarines in about 2048. Again, that's a long way away. But the other thing you have to realize is that while you're building two submarines remember the trough that we used to look at is where this black line goes under the red line, you've now greatly reduced that. And for every second submarine you build instead of one, that's another submarine that you have in the inventory during the critical coming decades. So you're chipping away at it.

FY	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	Total
	VCS Block V (12)					VCS Block VI (11)					VCS Block VII (10)					SSN(X)		
SSN	1															1	1	3
SSN w/ VPM	1	2	1	2	2	1	2	1	1	1	1	1	1	1	1			19
SSBN			1			1		1	1	1	1	1	1	1	1	1	1	12
CVN	CVN 80					CVN 81					CVN 82				CVN 83			

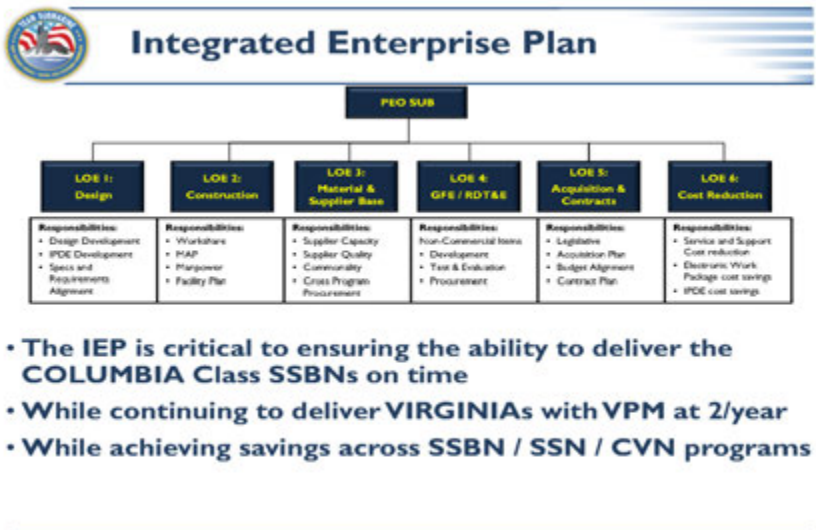
This represents the combined enterprise work: attack submarines, and I split it out into attack submarines and attack submarines with VPM; ballistic missile submarines, which is Columbia-class; and aircraft carriers, which is the *Ford*. Right now the program of record, because we haven't published a new shipbuilding plan, has this one-two, one-two cadence with one attack submarine every year where we're building a Columbia.

In testimony earlier this year with the rollout of the Navy's '18 budget, Acting Secretary of the Navy Stackley committed to changing this one to a two. So you can look at that and say okay, the second submarine in FY21 is going to happen. We're already programming for it in the

FYDP. We'll get advanced procurement two years early in FY 19. As I said, we're already entering into initial discussions with the shipbuilders on a block 5 contract for at least 10 submarines.

But, there are all these other ones beyond that. So the question becomes, what kind of commitment can we give to the shipbuilders and to the suppliers and vendors that make up the industrial base on submarine construction pace? Because our Congress appropriates money on a one-year basis, and because the Navy and the Department of Defense program for money on a five-year basis, we really don't know what's programmable beyond FY22 right now, because that's the FY18 FYDP which is in play.

Now of course the POM19 FYDP is almost done and POM20 has already started, so we do know what's going to go on. I can tell you that there will be an incredibly strong effort by the Navy everywhere you see a one here to change that to a two. You heard Admiral Johnson say it earlier today, we're going to build two per year forever. We have to in order to provide the requirements the force needs, the 66 attack submarines. We've been working very closely with the shipbuilders on ensuring that we understand exactly what has to happen for us to be able to build two Virginias with VPM and one Columbia in the same year, while we're of course building aircraft carriers down at the bottom.



So how do we do that? Well, the answer is the Integrated Enterprise Plan. Admiral Johnson referred to it. I'm going to refresh your memory. I showed you a version of this last year.

The key is we have defined six lines of effort and put teams together between PEO Subs, both the Virginia program and the Columbia program, PEO Carriers and the nuclear shipbuilders, Electric Boat and Newport News. They are focused on the design, LOE-1. This includes the design tool, Integrated Product Development Environment, which is a new tool that we have fielded for the design of Columbia.

We're also using it to design the Virginia Payload Module. It is well beyond the previous tool we used, Catia, but it is a process to get it fully fielded, all the bugs worked out and performing like it needs to be. We are doing well at that. We will continue to work on it and it will provide us the capability we need to design.

The other part that that tool does is not only the technical authority, but how you go build the submarine or the aircraft carrier. There are a lot of advances being made by both companies, Newport News with the integrated digital shipbuilding. This is, instead of walking down to the shop or to the graving dock with a stack of paper to tell you how to weld a hanger to a bulkhead or the hull, it's walking down with an iPad.

That provides a tremendous advantage in terms of augmented reality. You can just hold up the iPad and it focuses on targets that are set into the system and shows you exactly where it has to go, rather than trying to take measurements off of a drawing. It is more user friendly and it's a system that the young employees coming into the yards today find more familiar with what they're used to from already growing up in the digital age.

Line of effort two, construction. This is mapping out the build plan. How you build two different submarines and an aircraft carrier in common facilities across the shipbuilding yard, and really nailing down through the manufacturing and assembly plan how the components move through the yards.

Line of effort three, this is one that gives me probably the most headaches because line of effort three focuses on the material procurement side from the suppliers and vendors that make up the submarine industrial base, and also those that contribute to the aircraft carriers as well.

The workload that is ramping up in the coming decade is so significant, beyond what we have seen since the very height of the Cold War, that we are out there every day assessing individual suppliers and making sure that they have the capacity and the quality to meet the requirements for the programs. If they do so, then the next step is how can we combine purchases with the suppliers, from the prime contractors, across these three programs such that the Navy reaps the benefits of increased economic order quantity? That's a tough process, because it really requires managing that supplier base strategically instead of on a transactional basis.

Line of effort four is government focused. There's a lot of government furnished equipment that goes into the submarine and the carriers, things like propulsor, the non-propulsion electronic systems, which is ARCI, TI-APB, submarine warfare federated tactical systems, SWFTS, and then also the component development.

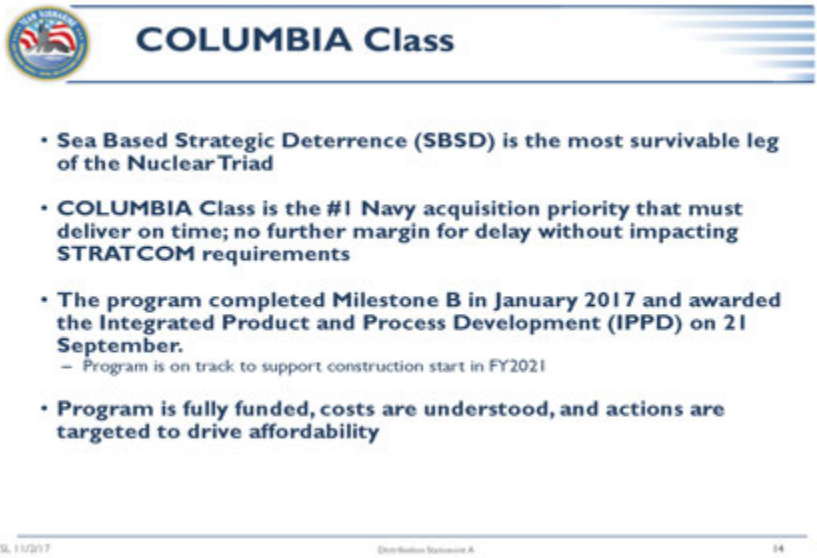
Line of effort five is acquisition and contracts, working very closely with Congress to get the legislative authority that we need to do things like missile tube continuous production, which I talked about.

Finally, line of effort six. Line of effort six is cost reduction, making sure that these boats remain affordable and doing everything we can to reduce the cost such that the burden on the rest of the shipbuilding that the Navy needs to do is not outweighed by submarine construction. This Integrated Enterprise Plan is critical to the success of both the Virginia and the Columbia program, and also the aircraft carriers for common material.

Let's move on to the Columbia program. Again, a very good year. Since I addressed you the last time the biggest thing is that we successfully achieved Milestone B. We went before a Defense Acquisition Board in November of 2016 and then USD AT&L Frank Kendall signed the milestone decision authority memo in January 2017 in what was probably one of his last official acts before administration turnover. We have achieved the transition to the EMD phase, engineering and manufacturing development.

The other big thing was in September, so a little over a month ago, we awarded the integrated product and process development contract to Electric Boat to complete the design of the Columbia. We were oper-

ating under an R&D contract for early design. This now moves us into the detailed design and construction readiness phase and sets us up for



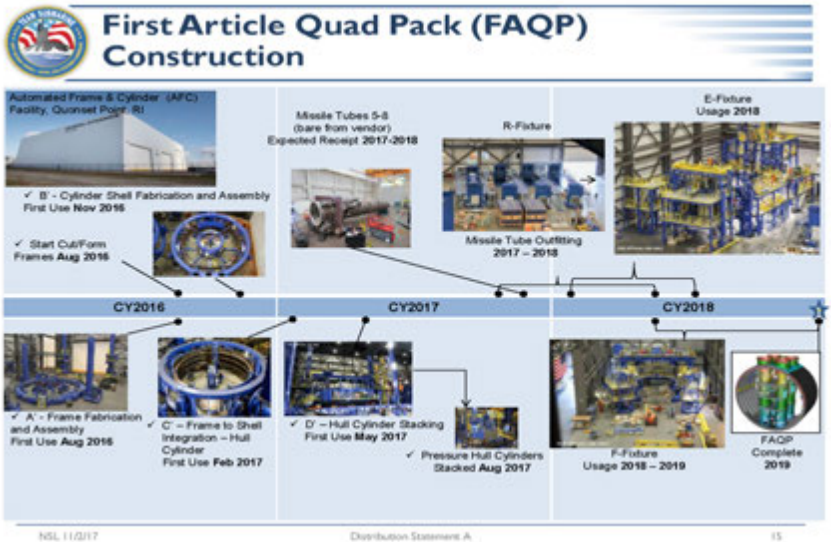
completing the design and then starting to order long lead time material and then starting construction on the first boat in 2019.

So, although our official construction start is 2021, we're actually going to start using advanced procurement and advanced construction authority that has been in legislation since 2016 to start construction in 2019 on key early components. However, in reality, we have already been in construction for over a year because we had arranged for special R&D funding for several prototype efforts. The biggest prototype effort is the first article quad pack construction.

A little on how to build a submarine 101, it's through a series of fixtures, and the A fixture marries webs and frames in the cylindrical basis, and so you end up with one web and frame, circular, coming out of the A fixture. It then goes to the B fixture where the shell plating is rolled and assembled using a very close tolerance circularity requirement. Then in the C fixture that shell comes down and you marry the web and frame from the A fixture goes inside the shell and is welded into place there.

A set of web and frames from the A fixture go in there and make up

the full half cylinder, and then two deliverables from the C fixture go into the D fixture and get stacked together. That becomes your first hull cylinder. That is just for a normal hull cylinder. For what we're doing in the



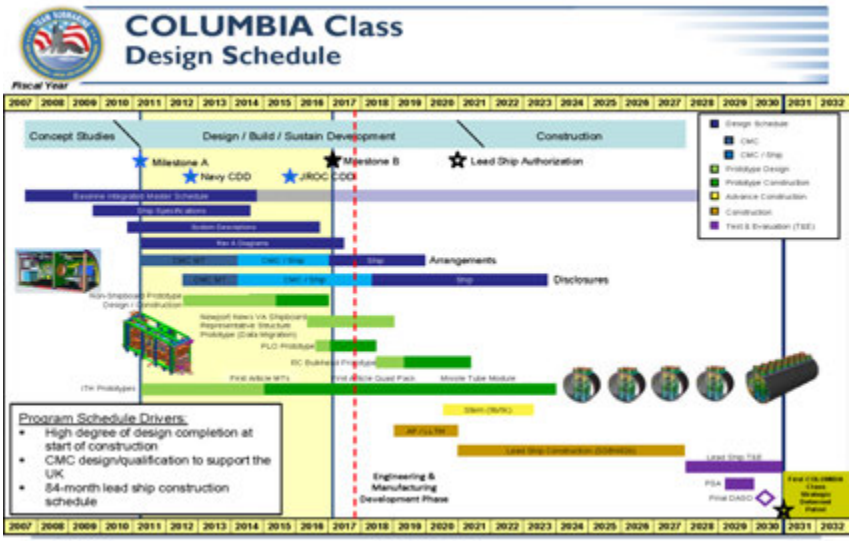
automated frame and cylinder facility for Columbia in Quonset Point, is then marrying that with work on the missile tubes coming in and getting outfitted on the R fixture. Then they go into the E fixture where they are paired together, four tubes into a quad pack, and then they go into the F fixture and those four tubes get married with the hull cylinder that came through A, B, C and D to form the first article quad pack.

This is a time lapse video that shows you some of what I was describing. It's not in sequence the way that I did, because of the vagaries of shipbuilding. Over the time that they were doing this video, it just doesn't line up to go A, B, C, D, E and F.

The next thing, the first missile tube, has already arrived. The second missile tube is supposed to arrive today. (Editor's Note: Someone in the audience said that it did arrive.) It did. That's really good because it was stuck at the border of Rhode Island for quite a while, while they worked out road permits and finishing construction on road repairs, so they could actually get into the state. So the second missile tube has arrived. They both go on the R fixtures and will have piping packages outfitted onto

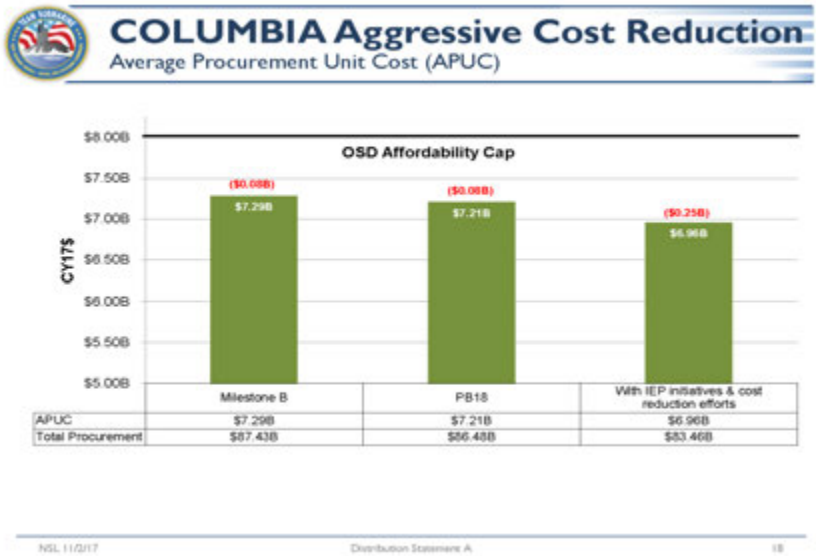
them.

So this process is critical to the ability to build the ship in seven years. It is fundamentally different from the way we did it on Ohio. By starting it now, prototyping it early and working all the bugs out, it will provide significant benefits down the road.



Other prototypes that are in progress right now, we already finished the non-shipboard prototype. We're prototyping two efforts in partnership with Naval Reactors, the propulsion lube oil system prototype and the reactor compartment bulkhead. This prototype, commonly known as the birdcage, is a Virginia section that we're using to transmit data from Electric Boat down to Newport News to ensure that everything talks to each other and they get a workable product in Newport News. As I said, the biggest one of all, first article quad pack, we'll make four of those and produce the first missile tube module for the first ship, all under R&D funding as a prototype.

The last thing I want to talk about is cost. As I mentioned a couple of times already, we're sensitive to how much this program costs and we're working on it aggressively to ensure that we always remain underneath the affordability cap and that we're doing everything we can



to further reduce cost. At the Milestone B our average procurement unit cost, APUC, was defined as $7.3 billion. That is the average cost across all 12 ships in CY17 dollars.

The affordability cap was assigned at $8 billion, which is 110 percent of $7.3 billion. In the first year since the Milestone B was achieved, through innovative legislative authority and contracting techniques, we've already reduced costs by $80 million per hull to bring APUC down to $7.21 (billion). That was a combination of missile tube continuous production, which I talked about, and advance construction, which is pulling key construction activities to the left. Really the focus of that was to reduce the risk of not delivering on time, but it had an added benefit of savings as well. So those two efforts, advanced construction and continuous production of missile tubes, resulted in a new APUC of $7.21 (billion).

Within the IPPD contract that I discussed we awarded a little over a month ago, there's also a significant cost reduction incentive for the lead ship. So we are incentivizing the shipbuilders to do everything they can to continue refining the design and the producibility methods within their yards to reduce the cost of the lead ship, and then of course the ships that

follow after that. But the incentive is measured on the lead ship, so if we're successful in that, and if we're successful in some of the additional legislative authorities we're pursuing, and funding that we're working with the Navy to provide, such as continuous production of other things besides the missile tube, then we have the ability to get APUC below $7 billion. That is a stretch goal, but again as I've said, when you understand that the cost of this program is significant, then we really need to do everything we can to buy margin back into the program, both in terms of cost and schedule.

With that, a quick tour around recognition of ARCI's 20th anniversary, Virginia program, the Columbia program and the Integrated Enterprise Plan, I'll be happy to take a couple of questions.

Due to limited space in this issue, speeches from the 2017 Annual Symposium which will be featured in the next issue will include:

- Captain Brian Davies - *Update on Submarine Personnel*
- Program Managers Panel - *Technical Update and Overview*
- Junior Officers Panel - *Q&A*

NAVAL SUBMARINE LEAGUE
35TH ANNUAL SYMPOSIUM

UNITED STATES SUBMARINE FORCE: GETTING FASTER

UNITED STATES REPRESENTATIVE
JOE COURTNEY (D-CT)

Ed. Note: Congressman Courtney spoke at the invitation-only President's Breakfast with Annual Symposium Sponsors.

Thank you, John. That's high praise coming from a person that is so respected both back home in Connecticut, but obviously with this great coalition that's here this morning. Congratulations on your great service in terms of this – I mean, it was seven years of a lot of transformation in terms of where the League stood seven and a half years ago when you took over, in terms of some of the challenges both in terms of Congress and the Navy. You're leaving, obviously, on a high note in terms of, as you said, a good place right now for the Submarine League.

Congratulations to Jay Donnelly. He's still a part of Red Sox Nation, as far as I'm concerned, in terms of his roots. So, congratulations on taking over. Again, I can't think of a better person to keep the momentum going forward.

I know a lot of the folks here are so attuned and well-versed in terms of what has been going on that I don't need to really start from scratch in terms of where the budget process and NDAA process is, which I'm sure is probably the most relevant topic that people are interested in hearing about this morning, as Admiral Jabaley and I were just talking. So what I thought is I'd just sort of jump right in in terms of where we are today, on November 2nd, as far as trying to keep this momentum moving forward. Ten years ago we were sort of limping along in terms of the build rate and there was no design work being done for Ohio Replacement. As the admiral said, we're certainly in a much different place today.

So what I want to begin with is just sort of a positive vignette in terms of Washington, as far as the NDAA. About a week and a half ago we had the passing of the gavel ceremony at the conference committee,

which was actually a pretty special moment as far as I'm concerned, because it was really John McCain's opportunity to really preside over something that was near and dear to him. Not just the content of the conference committee, which obviously was the authorization for our military, but also the process that was sort of taking place there.

If you look at the Congress today, a lot of the real indicators of the fact that we're just not really functioning the way that we're supposed to, which obviously the whole country is sort of frustrated by, is the fact that it is a rare bird now to actually have a conference committee. In fact, there are many staff in terms of committees all across the Congress that basically wouldn't even know how to conduct a conference committee because it has been so long since some of the committees have actually gone through this process. The Armed Services Committee, in some ways, is sort of the one happy place or safe haven where they actually know how to do it still.

In this room over on the Senate side where the House and the Senate conferees met, again it was really like an old school process that was taking place with the chairs and ranking members and a lot of the other conferees that were appointed by leadership, in the room. There really was just like School House Rock, the exchange that took place between the House members and the Senate members about different areas where there was sort of a Delta between the two bills that came out of both chambers.

For Senator McCain in particular, he actually got pretty almost emotional and passionate about the fact that if you look at the votes that came out of the House and the Senate on the NDAA, in the House it was the largest bipartisan vote for an NDAA since 2008. That was only surpassed by the Senate vote that took place. I don't think it's unrelated to the fact that both committees actually, again, are old school.

They allowed the subcommittees to meet and mark up a subcommittee mark. That goes to the full committee and, as we all know, a long day of markup takes place in the House and Senate, and it goes to the floor and there's a relatively open amendment process that takes place there, and then you get this conference process. The fact that it allows the process to breathe, clearly is, I think, the reason why there's so many buy-in and the vote totals are so impressive in terms of bipartisanship.

Again, I give great credit to Chairman Thornberry and Adam Smith and Reed and McCain about the fact that they really respect that process. If an amendment is offered on either side, and they're on the losing side, it's okay, let's go to the next one. There's no sort of scorched Earth requirement that their members and their caucus have to line up in lock-step just because there's a "D" or an "R" next to the person offering the amendment. As I said, he got pretty – almost choked up talking about the fact that this is something that is really missing in too many other places in the Congress. We really should sort of all take that to heart, the members that were there, in terms of trying to really foster that type of process.

So having said that, the process itself that's taking place, as we know, the president's budget that was submitted was actually strong in terms of submarine funding, both for Virginia and the Ohio Replacement Program. The numbers were, I think, really in line with keeping the momentum going forward. I would sort of note that last December when we did the CR to keep the government open and allow the new administration to weigh in on the 2017 budget, the fact that we were able to get that anomaly in for Columbia-class, which had to be the biggest anomaly if not close to the biggest anomaly, that really again underscored the fact that the support for the Columbia-class program really was even able to overcome the sort of drag or momentum of the CR, and it shows the really strong support for that program.

In any case, the president's budget came over and kind of incorporated all the right numbers, as far as that goes. Within the committees the real question was whether we were going to take that to a higher level, and in fact we did, as I think many of you know, in terms of authorizing a higher number for the Block 5 cohort up to 13 subs. We tried to tweak the National Sea-Based Deterrence Fund to allow critical components to be included in the continuous production language which Admiral Jabaley was extremely helpful in terms of fleshing out the value of that in terms of really keeping stability in terms of both hiring and material acquisition, that continuous production allows.

So going into conference, the Block 5 language was in both the House and Senate. The continuous production, there was a gap. The Senate did not move forward in terms of including that in their provision.

So all I can say is there was a friendly debate on that latter issue, on the continuous production language, and we've had some good conversations with Senator Reed, who I guess will be speaking tonight at your dinner, and we feel pretty good that we're going to have a good outcome as far as that goes. Again, we don't have final, final yet. The big four met yesterday to go through the last remaining issues that we're settled at the staff level, or at the little four, or at the subcommittee level.

What I would say is that it's no great surprise. The sticking points that are left, number one, are the Space Corps, which as many of you know there was a provision in the House bill that wanted to create a new Space Corps, and that was not included in the Senate bill. The Air Force is obviously pretty vociferous in their opposition to that. I don't have any inside skinny in terms of how that's going to get resolved. My sense is that's not an issue that we have any great urgency to have to set up a new branch of the military, so I'm doubtful that that's going to be in the final bill. But having said that, I know it was certainly a topic of discussion for the big four.

The topline, obviously, is the real question of the day. How we grapple with that – I mean, there's different scenarios that people are sort of trying to think through. As you know, the topline that came over from the president's budget was $603 (billion). The number that the House used was $640 (billion). Frankly, whether or not people just kind of close their eyes and jump in the water and hope that it's going to be from the appropriators at the higher number, or whether we just wait to see what the appropriators signal in terms of what the topline will be.

My sort of pundit's cap is that it will be somewhere in between them probably, and even if we do come in higher with the NDAA – as many of you know a couple of years ago that happened and we just went back in and adjusted when there was a different number that came from the appropriators. So by and large I think we're at a pretty positive place in terms of the key issues that the Submarine League is concerned about. If we do get a higher number, then that really, I think will lay the groundwork for a larger block buy in the Virginia-class. Obviously, to the extent that we can go above the $603 (billion), that allows some strong potential for advance procurement money that will make a larger Block 5 contract possible. That's certainly the issue that our subcommittee,

Congressman Wittman and I are focused on like a laser, is trying to maximize the resources so that we can have as large a block buy as possible.

That's obviously not happening in a vacuum. What again is quite extraordinary, to go back to John's introduction, is the real change in climate even in the House Armed Services Committee in terms of the value of the submarine force and the urgency to really recognize that the force structure assessment they talked about growing the submarine fleet to 66 subs is something that just gets reinforced over and over again by combatant commanders that appear before the committee, whether it's Admiral Harris or General Scaparrotti. It is the number one priority, but they are all completely in sync that the undersea domain needs to be jealously protected and guarded. It's a completely different environment in terms of trying to make the case for the value of the submarine force, which when I came in in 2006 I had pretty hawkish members looking at me saying, why do we need submarines? That is a completely different, as I said, environment that we're in today.

As I said, I think the Submarine League has been a huge part of that advocacy and change of climate. The Submarine Industrial Base Coalition, which again I think has been a brilliant tactical and strategic ally from external forces that really have changed a lot of the members who don't come from coastal districts or shipbuilding districts, but now understand that the supply chain extends all the way into the heartland. All those have come together really quite impressively in terms of getting us to this new place in terms of people's understanding about the value of the submarine force.

To all of you here that are a part of that, you should take a bow, for sure, in terms of the success that we're experiencing today versus a number of years ago. I'm impressed at the early attendance here this morning in terms of talking about a topic like this. I don't know if you wanted me to take a few questions, but I'm certainly glad to open it up.

NAVAL SUBMARINE LEAGUE
35TH ANNUAL SYMPOSIUM

UNITED STATES SUBMARINE FORCE: GETTING FASTER

UNITED STATES SENATOR JACK REED (D-RI)

Ed. Note: Senator Reed was the Banquet speaker.

Thank you very much, John. I noticed a certain sensitivity to the military academy at West Point. I'll just forget about that. I am delighted to be here. This is a great assembly of true patriots who support our men and women, particularly in the submarine service, and thank you all for that.

I want to thank Admiral Donald and Rear Admiral Padgett for inviting me to this event. Let me also recognize all the distinguished flag officers, both active duty and retired, that are here. I felt a little lonely with all these Naval Academy graduates, but I'm glad to see that General Dick Cody (ph) is here. Dick was our vice chief of staff in the Army. I was Dick's section leader at West Point when he was a plebe. Back around 1970, if you said Dick was going to be a general and I was going to be a senator, people were wondering what we were doing in our free time. But, Dick thanks for being here.

Let me also recognize this evening's honorees: Mr. Dan Tyler, Admiral Powell Carter, Vice Admiral Dan Cooper and Vice Admiral Ron Thunman. It is fitting that the Naval Submarine League call attention to the selfless service of both civilians and uniformed personnel, and thank you all for your dedication and service to our submarine forces and to our nation.

The theme of this year's symposium is "U.S. Submarines Getting Faster." Over the past two days you've discussed the current state of our submarine forces, the acquisition outlook, the advancement of new technologies and the challenges ahead. As with the beginning of any new administration, there have been many uncertainties about prospective nominees, budget details, and program plans, so moving fast on any of these items, much less getting faster, can be a challenge.

But despite the turbulence in Washington and around the world, I'm proud to say that our submarine forces continue to be the reliable point of the spear in so many different ways. And the submarine builders continue to efficiently construct these platforms and vessels with an absolute devotion to giving our men and women in the submarine service the best possible vessel they can build. And I would argue that in many respects the submarine community is already going faster, much faster than any other Navy acquisition program and other service programs. We're beginning to see the delivery of two Virginia submarines a year. No less important, the Navy has been modernizing existing submarines at a faster pace by applying open architecture to combat and sonar systems.

On a personal note, I've been very, very pleased to have been at a keel laying and a christening just this year for two Virginia-class submarines. But I think even with this success we have to – and you have been the last several days – asking where do we go from here? First, you have to consider the threats, how they're evolving and the importance of maintaining the superiority and technological edge that we enjoy, particularly in the undersea domain.

The increased threat from North Korea -- and I was there about two weeks ago on the DMZ and at Camp Humphries -- that threat and other provocations across the globe, have re-emphasized the importance of maintaining a strong nuclear deterrent through all aspects of the triad, particularly with our stealthy submarine fleet. We also know that near-peer competitors like Russia and China are investing heavily in their maritime capabilities, particularly their submarines. They are seeking to expand their operational reach.

And then we have asymmetrical challenges from state and non-state actors like piracy and swarming attacks. These continue to challenge our surface combatants. We should also not take for granted our advantages in stealth technology as we recognize our adversaries are coming closer to emulating what we do well, and indeed infiltrating our protective shield.

One of the areas obviously we're going to have to think about is the Arctic – and I can remember the Life Magazine photo of the Nautilus crashing through the Arctic Ocean. We all know now the Arctic will be within years a major artery of international commerce. We have to think

about how we deploy there too.

So we have a full range of threats and in each and every one of these threats the submarine is critical, both attack submarines and our ballistic submarines. Given these threats, you have to look seriously at our submarine force structure. The president has directed Secretary Mattis to conduct an overarching review of defense policy and programs. We're still awaiting the results of that review, but we all have great confidence in Secretary Mattis. He is an extraordinary Marine and civil servant.

President Trump's long term plans for defense spending were foreshadowed in the campaign when he talked about a 350-ship Navy as his goal. The chief of naval operation's force structure assessment is calling for 355 ships, including 66 attack submarines. Achieving this goal of 66 means adding 18 attack submarines to our previous force structure of 48, and I think there's a strong consensus across the board in both Houses, both parties, that the submarine is a system that we have to invest in more.

It's an appreciation of all the things that I've mentioned, the stealth, the ability to operate in the waters that other platforms can't operate in. This is a far cry from the good old days way back when the Navy thought 34 submarines were enough. We are in the business of trying to develop more submarines. But if the goal is 66 or even a number around that, the whole industrial base, including builders and suppliers, need to be ready to respond to these increases.

In fact, you're going to have to get faster. We're going to have to accelerate, there is no question, and particularly the submarine forces of the United States Navy. As I said, more and more of my colleagues, more and more defense theorists, are recognizing the value and power of submarines.

If we were doing two boats a year, that would get us to 66 except for the fact that we weren't building many submarines in the '90s. From 1991 to 2000 we built the *Connecticut*, the *Jimmy Carter*, the *Virginia* and the *Texas*. My baptism of fire was walking in in 1991 and discovering the Seawolf program was going to be cancelled and we were in big trouble.

Fortunately, with a bipartisan effort, we were able to extend Seawolf to begin Virginia, and that has kept us going. But we're going to see a lot

of boats, as you know better than I, that are going to be retired in his decade. We have a pace of acceleration to a higher number at a time when we're losing ships as they retire. So we're going to have to do a lot to right-size the submarine force.

I understand that now we have to have the will and the muscle to get the resources to do it. We have to have significant investments in our manufacturing infrastructure, and in our workforce, and we are beginning to do that. But again, we're going to have to really pick up the pace, so your message of being faster is right on the money.

In fact, as we all know, we're going to have to begin to reset our industrial base. We did it for two ships a year, and now I hope we're going to do it for more. That means budget, and it means, how do we respond?

I am working very, very hard with my colleagues not only on the authorization committee, but I'm one of two people who also serve on the defense appropriations subcommittee, to make sure we have the resources necessary in the '18 budget to keep going faster, particularly to expand our industrial submarine base. I must confess, though, that sometimes Congress is a hindrance, not a help. We have -- and this is something that I'll indulge in some self-criticism – we have notoriously been delaying budgets. That causes chaos in the services, not just the Navy.

I will never forget when I was with Senator McCain having a hearing and Admiral Richardson sort of routinely mentioned that the Navy plans to do nothing in the first quarter of any fiscal year. That is not the way to do business. I know my colleague John McCain is committed, and we all are, to get back into a regular order where we can produce appropriations and budgets on time, or at least within a safe margin of error.

We also have to recognize that the Budget Control Act caps are untenable. We do. I am more and more confident that in the next few weeks we are going to move on a bipartisan, bicameral basis to raise the caps sufficiently so we can fund adequately defense needs. One of the problems with the BCA is that it created this arbitrary delineation between defense and non-defense, instead of national security and something else.

As a result, on the non-defense side is State Department, Homeland Security, and these functions. So we really do, if we're thinking of national security, have to raise both caps. Otherwise, we won't have the diplomats, we won't have the Homeland Security officials that we need,

among other things. That, I think, too, will happen.

We also have to recognize that in order to build our industrial base, it's not just about money to buy steel and to provide resources to the contractors, but we also have to train individuals. That means the Department of Labor, another one of those non-defense items, has to be able to help out with training program. I'm very pleased that in my home state of Rhode Island, Electric Boat has partnered with a local school system and the Community College of Rhode Island to build a very innovative training facility for young people who want to be welders and sheet metal workers. They are being supported by money that we obtained and gave to the state, and they have deployed it very wisely.

So we are in a situation now where we have to keep moving forward. We also recognize that one of our greatest assets, and I've said this repeatedly because it's true, is the submarine. One of the reasons it's our greatest asset and one of the reasons, frankly you've made my work a little easier, is because in terms of acquisition programs there's no program better than the submarine program.

They're delivering the Virginia-class on time, typically ahead of schedule. We haven't seen some of the huge cost over-runs in other programs, and that is a tribute to so many people in this room. Thank you for that. We have to do better, though, because the demands are greater and the resources are always less than what we'd like to see ideally.

We also have to understand something else. It's not just the new construction. I was really shocked when the CNO came over and talked to me about submarines that couldn't leave port because they lacked their diving certification and that they needed overhaul. In fact, the situation has gotten so bad that 15 boats have been idled for 177 months awaiting access to dry docks. So not only do we have to build new ships, we have to put the resources in and creatively make sure that we can keep our existing fleet operating successfully through maintenance.

Again, we are committed to the submarine. We are also not just committed to the Virginia-class. We understand we have to have the Ohio-class replacement, the Columbia-class submarine. It's particularly the case in terms of the overall renovation of our nuclear triad.

The first leg that is being dealt with is the submarine. I think that makes sense because it's the least vulnerable part of our triad. We're

beginning to build the Columbia-class. The first ship is scheduled for delivery in 2031. We've got to stay on that schedule, and that will be an arduous effort by both the contractors and by the Department of the Navy and practically everyone in this room.

The Navy has made the Columbia their number one priority. I think that makes a great deal of sense and we support that priority. To improve resources for the Columbia, because it is a rather big ticket item, back in the National Defense Authorization Act of 2015 I created something called the National Sea-Based Deterrence Fund.

The fund has allowed the Navy to do things they couldn't do otherwise. For example, after the Navy did a very rigorous review of costs with respect to the Columbia they authorized the contractor to build the Common Missile Compartment for all the Columbia-class boats using continuous production methods, not waiting as we typically do to authorize each ship each year, etcetera. The estimated savings over the 12 boat program is about $200 million. That's good for us and good for the Navy and good for the nation.

And we're looking for the Navy to identify other candidates for this type of acquisition and funding. That's something I think that is actually critical.

We have 3,600 workers at Quonset Point in Rhode Island and we have many other Rhode Islanders who work at Groton. Together with Newport News -- which has been an extraordinary partner and I thank them -- we have, as I said, made the submarine the premier example of good sound solid acquisition.

It is, as I said also, the system that we need the most, given the world that we look at today. You have been a big part of that. I can remember, again hearkening back to 1991 when we were scrambling to see if the Seawolf would survive, meetings of the Submarine League, meetings of the submarine industrial base, with everyone coming together. That effort allowed us not only to preserve our construction, but also to put us in a position where now we are really moving out faster and faster, as your conference this week indicated.

I thank you for that. I will take a few questions. There's only one topic I won't talk about, and that's Army football.

Once again, thank you for your courage, your patriotism, your ser-

vice and your commitment. Indeed, one of the things that unites all of us, and even in these tempestuous times in the House and Senate, is the realization, I hope, that what we do ultimately affects the lives and welfare of young men and women who are wearing the uniform of the United States. Many in this room, practically all, like myself, who had the privilege of wearing that uniform, we respect and honor those young men and women.

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LETTER TO THE EDITOR

As a former submarine nuclear reactor operator and having served in the Pacific for several years aboard a boat engaged in highly classified operations during Admiral Hymen G. Rickover's reign, I have found the recent letters from Norman Polmar and Timothy S. Wolters to be fascinating in their conflicting perspectives and analyses of this controversial man. There is, of course, an adulation which creates an unspoken contrast to the fear and disdain he created among so many of us in the enlisted nuclear submarine navy; all of this was in spite of his outstanding contributions for the establishment of standards so necessary for safe nuclear operations. And I did watch these high standards result in the mandatory departure of suboptimal officers and enlisted men who failed to meet the admiral's rigid requirements for nuclear operations-those departures and those standards certainly protected our Navy from potential errors in submarine plant operations that might otherwise have been catastrophic. Also, his earlier persistent efforts to create necessary monetary allocations for submarine nuclear power development certainly were essential to allow our country's jump-start into this important arena.

However, his apparent fascination with elements of vindictive pettiness clouded these laudable activities. A single example illustrates our crew's direct experience in this regard. After our year-long effort to successfully complete a dangerous espionage mission in the Pacific, documented in Spy Sub: A Top Secret Mission to the Bottom of the Pacific, (Naval Institute Press) the admiral arrived in civilian clothes at Mare Island one afternoon and refused to show his identification to the Marine guards. They jumped into a pickup truck and followed his car around the base as he tracked down and located our submarine in the shipyard. I was on watch inside the boat at the shut-down nuclear plant; we knew he was coming and we all dreaded his arrival. He crossed our brow unto the topside deck, the petty officer on-watch asked for his identification and he (again) refused to show it. His aide announced the obvious, "This is Admiral Hyman G. Rickover!" and the topside watch immediately hollered, "Attention on deck!" Everybody saluted, and the topside watch then scoured his list of men allowed aboard the submarine. He finally

announced, "I'm sorry, Admiral, you are not on the Access List, I cannot allow you aboard." Rickover, seemingly insulted, spun around furiously and his car (with Marines following) roared off the pier in the direction of the base command center.

Soon thereafter, our boat's captain was summarily removed from his command in spite of having just led our crew through some of the most challenging and nearly impossible submarine operations deep beneath the sea. This time at sea included the full-dive failure of our bow planes, the loss of a man overboard in a State 7 sea and recovered in a hypothermic state, multiple reactor shutdown failures and emergencies, a major flooding event, and repeated failures of our sophisticated espionage equipment. We were, however, in the end, finally successful directly because of his outstanding leadership which inspired us to overcome the challenges; he was awarded the Distinguished Service Medal, and our entire crew received the Presidential Unit Citation. We revered our captain and for him to be summarily removed from command, with the accompanying destruction of his outstanding career for reasons of petty vindictiveness, is one of the most egregious actions I have ever seen during my years in the Navy. Admiral Rickover was not admired by our crew; he was loathed as much as he was feared. None of this perspective ever seems to surface even in some of the most learned dissertations from many seemingly well-informed authors.

And so, with these considerations, perhaps the best summary of Admiral Rickover as a man and as an officer would be that he was the best of all men and, at the same time, he was the worst of all men.

Sincerely,
Roger C. Dunham, M.D.
Email: rcdunham@verizon.net

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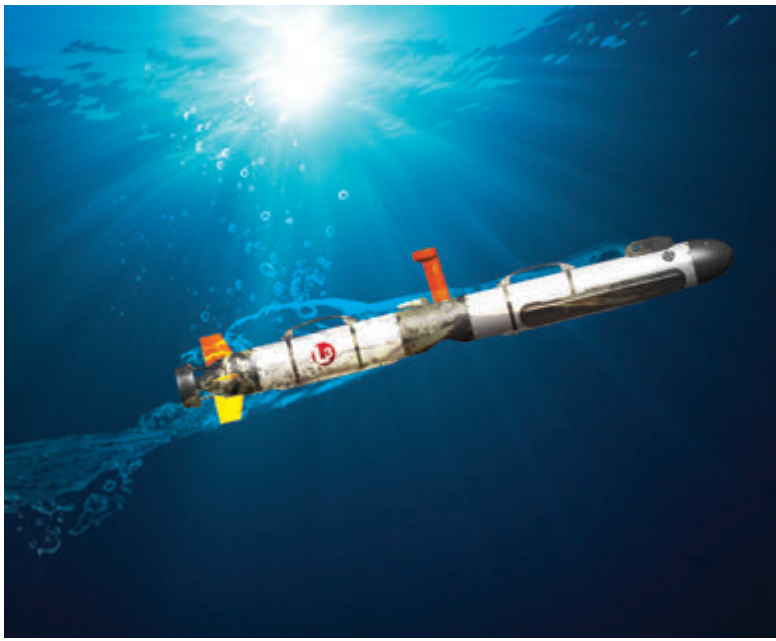

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