

**DEPARTMENT OF DEFENSE AUTHORIZATION FOR  
APPROPRIATIONS FOR FISCAL YEAR 2020 AND  
THE FUTURE YEARS DEFENSE PROGRAM**

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**HEARINGS**

BEFORE THE

**COMMITTEE ON ARMED SERVICES  
UNITED STATES SENATE**

ONE HUNDRED SIXTEENTH CONGRESS

FIRST SESSION

ON

**S. 1790**

TO AUTHORIZE APPROPRIATIONS FOR FISCAL YEAR 2020 FOR MILITARY  
ACTIVITIES OF THE DEPARTMENT OF DEFENSE, FOR MILITARY CON-  
STRUCTION, AND FOR DEFENSE ACTIVITIES OF THE DEPARTMENT OF  
ENERGY, TO PRESCRIBE MILITARY PERSONNEL STRENGTHS FOR  
SUCH FISCAL YEAR, AND FOR OTHER PURPOSES

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**PART 2  
SEAPOWER**

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MARCH 27; APRIL 10, 2019



**DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2020 AND THE FUTURE YEARS DEFENSE PROGRAM—Part 2 SEAPOWER**

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**DEPARTMENT OF DEFENSE AUTHORIZATION  
FOR APPROPRIATIONS FOR FISCAL YEAR  
2020 AND THE FUTURE YEARS DEFENSE  
PROGRAM**

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**WEDNESDAY, MARCH 27, 2019**

UNITED STATES SENATE,  
SUBCOMMITTEE ON SEAPOWER,  
COMMITTEE ON ARMED SERVICES,  
*Washington, DC.*

**NAVY SHIPBUILDING PROGRAMS**

The Subcommittee met, pursuant to notice, at 10:00 a.m. in room SR-232A, Russell Senate Office Building, Senator David Perdue (Chairman of the Subcommittee) presiding.

Subcommittee Members present: Senators Perdue, Wicker, Cotton, Ernst, Hawley, Hirono, Shaheen, Blumenthal, Kaine, and King.

**OPENING STATEMENT OF SENATOR DAVID PERDUE**

Senator PERDUE. We will come to order and go ahead and get started.

The Senate Armed Services Subcommittee on Seapower convenes this morning to examine Navy shipbuilding programs in review of the defense authorization request for fiscal year 2020 and the future years defense program.

We welcome our three distinguished witnesses this morning: the Honorable James F. Geurts, Assistant Secretary of the Navy for Research, Development, and Acquisition. Good morning. Vice Admiral William Merz, Deputy Chief of Naval Operations for Warfare Systems; and Lieutenant General David Berger, Deputy Commandant of the Marine Corps for Combat Development and Integration.

General, congratulations on your nomination to be the next Commandant of the Marine Corps.

Delighted to have you three here today. Thank you for your time and effort.

This is my first public meeting as the Chairman of the Seapower Subcommittee. I am humbled to be leading this Subcommittee and will do all I can to support our men and women in uniform.

Today we have the smallest Army since World War II, the smallest Navy since World War I, and the oldest and smallest Air Force ever. At the same time, we face complex threats from China, North

Korea, Russia, and Iran. A robust naval fleet is critical to deter aggression worldwide, project power, and support our allies.

The Subcommittee on Seapower will provide vital oversight and support for our Navy and Marine Corps as they work to meet this increasing demand for global missions. I want to thank Senator Wicker and Senator Hirono for their leadership over the past 4 years. I hope this Subcommittee will continue to work in a bipartisan manner. I fully expect that.

Earlier this month, the Subcommittee received a classified threat assessment and learned how our Navy and Marine Corps plan to operate in the face of these ever-growing new threats. As we begin consideration of the budget request, this briefing was very helpful in providing context for our next series of budget-focused hearings on shipbuilding, naval aviation, and Marine Corps ground systems. Thank you again, Admiral Merz and General Berger, for your participation in that and for the private briefings that you guys have given us.

In 2016, the Navy increased its minimum requirement to 355 battle force ships, a reflection of the strategic shift to great power competition. Today, the Navy stands at just 289 battle force ships. While I understand the Navy is reassessing the fleet size requirement, I believe the need for a larger, more capable fleet is clear. I look forward to hearing from our witnesses today about the Navy and Marine Corps plans to achieve these requirements as soon as possible.

In addition to a global security crisis, we also have a national debt crisis. Last month, our national debt topped \$22 trillion. General Mattis and others have called the debt the greatest threat to our national security, and I agree. It is no secret that Congress' failure to pass a budget on time hamstrings our military and limits our ability to plan for future missions.

While there are many factors beyond the control of this Subcommittee, the Secretary of the Navy's comments caught my attention in December 2017 when he said "continuing resolutions (CR) have cost the Department of the Navy roughly \$4 billion. Since 2011, we have put \$4 billion in the trashcan, put lighter fluid on top of it, and burned it." I wish I had been smart enough to make that quote. That is pretty good.

Budgeting by CRs is no way to run the government, and Congress must do better. In this regard, I would like to hear from our witnesses today regarding the budgetary and operational impacts of continuing resolutions and the return of sequestration in fiscal year 2020 potentially.

Additionally, I would like to review a number of other shipbuilding-related topics, including the ongoing force structure assessment and the factors that led the Navy to conduct this assessment, greater clarity on the long-term funding plan and challenges related to welding and quality assurance with the *Columbia*-class submarine program; aircraft carrier programs, including the Department's proposal to inactivate the USS *Harry S. Truman* more than 2 decades early, as well as testing challenges in the lead ship of the *Ford*-class USS *Gerald R. Ford*; the Navy's plan to recapitalize the Nation's strategic sealift fleet; and options to improve acquisition performance on lead ships.

This Subcommittee will continue to work with the Navy and Marine Corps to build a larger, more capable fleet while at the same time demanding the best of our every taxpayer dollar.

I look forward to our witnesses' testimony, and I now recognize Senator Hirono and thank her for her steadfast commitment to this committee over the last 4 years.

#### **STATEMENT OF SENATOR MAZIE K. HIRONO**

Senator HIRONO. My steadfast commitment will continue with you at the helm. And, of course, congratulations to you who are chairing this very important Subcommittee. Of course, I look forward to working with you as we conduct active exchanges and dialogues with the Department in order to reach the best solutions to the issues facing our sailors and marines and their families.

I want to welcome our witnesses, and of course, I have my congratulations to General Berger for being nominated to head up the Marine Corps.

We are grateful to each of you for your service to the Nation and for the truly professional service of the men and women under your command. We also pay tribute to their families because, of course, we always say that the families are a very critical part of the success of the men and women in our armed services.

Today, our witnesses face difficult decisions as you try to balance the need to modernize and maintain our technological advantage against the need to support ongoing operations and sustain current readiness. The threats we face around the world require us to consider how best to get the Navy and Marine Corps the resources that we need, but we must make sure that any increase in resources does not come at the expense of important domestic programs that families, including our military families, rely on every day.

Last year, we had the benefit of an early budget deal that included increases in the DOD [Department of Defense] top line. This year, we are again facing the constraints of the caps in the Budget Control Act (BCA). The President's budget attempts to finesse the caps for DOD by moving a large portion of the base budget into the overseas contingency operations, or OCO, accounts that are exempt from the caps. I do not support such a gimmick and hope we can move quickly to achieve a deal on the budget resolution for fiscal year 2020 that avoids delays in getting the necessary resources to the Department and to other parts of the U.S. Government.

Today's hearing deals with various aspects of Navy shipbuilding. These Navy programs play a critical role in supporting and advancing our country's strategic interests in the Indo-Asia-Pacific region, including from bases in Hawaii. With that in mind, the Subcommittee has been focused on how we improve our acquisition, stewardship and thereby ensure that we are getting good value for every shipbuilding dollar that we spend.

Two years ago, the Chief of Naval Operations (CNO) presented us with a new force structure assessment. The Navy's 30-year shipbuilding plan last year would have increased the size of the fleet but would not have met the 355-ship goal.

This year, the 30-year shipbuilding plan indicates the Navy would achieve that goal in 2034. The attack submarine force goal

of 66 boats would be achieved in 2048, the same as last year. The goal for large surface combatants would be achieved in 2029. The surface force would remain at or above the level through the remainder of the 30-year plan. Last year's plan would have achieved the goal of 104 large surface combatants for only 1 year during the 30-year period, the year 2024.

Despite having a requirement of 12 aircraft carriers, this year's plan has a force of nine aircraft carriers for a little over a quarter of the 30-year plan. This is a significant reduction from last year's plan, which had at least 10 carriers for all but 1 year of the 30-year plan. Some of this erosion in carrier levels undoubtedly relates to the proposal to cancel the refueling complex overhaul of the USS *Harry Truman*, which I am sure we will hear more about. We have already had some discussions with you.

Last year, section 915 of the National Defense Authorization Act for Fiscal Year 2019 expanded the duties of Secretary Geurts' position to include acquisition and sustainment, including maintenance matters.

I am very encouraged that the Navy is not ignoring a vital component of maintaining a ready and capable fleet: our national shipyards. And, of course, Hawaii has one of them. These facilities, including the Pearl Harbor Naval Shipyard on Oahu, are essential for maintaining a ready and capable fleet. I am encouraged that the Navy has gotten serious about these critical assets that have been neglected, as far as I am concerned, for far too long.

I look forward to hearing from you this morning about how the fiscal year 2020 budget supports this plan.

I also look forward to working with the Navy to ensure that the shipyard modernization program stays on track.

Thank you, Mr. Chairman.

Senator PERDUE. Thank you, Senator Hirono.

Now we will hear from our witnesses. Secretary, I believe you are up first.

**STATEMENT OF THE HONORABLE JAMES F. GEURTS, ASSISTANT SECRETARY OF THE NAVY FOR RESEARCH, DEVELOPMENT, AND ACQUISITION; ACCOMPANIED BY VICE ADMIRAL WILLIAM R. MERZ, USN, DEPUTY CHIEF OF NAVAL OPERATIONS FOR WARFARE SYSTEMS; AND LIEUTENANT GENERAL DAVID H. BERGER, USMC, COMMANDING GENERAL, MARINE CORPS COMBAT DEVELOPMENT COMMAND AND DEPUTY COMMANDANT FOR COMBAT DEVELOPMENT AND INTEGRATION**

Secretary GEURTS. Yes, sir. Chairman Perdue, Ranking Member Hirono, distinguished Members of the Subcommittee, thank you for the opportunity to appear before you today to address the Department of the Navy's fiscal year 2020 budget request.

Joining me today are Vice Admiral Bill Merz, Deputy Chief of Naval Operations for Warfare Systems, and Lieutenant General Dave Berger, Deputy Commandant for Combat Development and Integration.

Sir, with your permission, I intend to provide a few brief remarks for the three of us and enter our formal statement in the record.

Senator PERDUE. Yes, sir.

Secretary GEURTS. I would like to start by thanking the Subcommittee and all of Congress for passing the fiscal year 2019 budget on time. The on-time receipt of the full budget allowed us to expedite the delivery of lethality and readiness to our sailors and marines while achieving cost savings through much more efficient contracting. It also helped stabilize the industrial workforce and our supplier base, both of which are critical to our success.

The 2019 budget allowed us to continue to build the navy and the naval force the Nation needs. This year, we will commission 12 ships compared to an average of five ships per year over the last 20 years. By the end of the year, we will have 296 ships in our battle force inventory. Not only are we building more ships, but their quality and capability continues to increase with each delivery.

We continue to improve the acquisition and contracting strategies to maximize the output for every taxpayer dollar, including saving more than \$4 billion for the construction of the third and fourth *Ford*-class carrier and saving over \$700 million on our next set of destroyers.

Our fiscal year 2020 request continues our commitment to build a 355-ship Navy, as well as the other capabilities the Navy and the Marine Corps require to meet the National Defense Strategy. Our request is the largest shipbuilding request in over 20 years and funds 12 battle force ships in fiscal year 2020, reflecting the critical role the Navy and the Marine Corps play in our National Defense Strategy. It funds 55 battle force ships within the future year defense program and results in a smooth and continuous ramp to achieving 355 ships in 2034, a 20-year acceleration from last year's plan.

This year's shipbuilding plan continues to reinforce the powerful combination of a strong and stable industrial base and predictable funding, as well as provides our initial estimates on the enduring cost of sustaining a larger Navy after 40 years of progressively smaller navies.

Recognizing that effective and efficient sustainment of the fleet is absolutely critical, we have also submitted the first-ever 30-year long-range plan for the maintenance and modernization of the fleet. This complements our 30-year shipbuilding plan. It outlines the growing maintenance requirements and the many initiatives the Navy is executing to improve the on-time completion of maintenance activities. It complements the many other actions the Navy and the Marine Corps are taking to improve the readiness of the entire force.

Finally, the Department of the Navy continues to place a priority on fielding new technologies and capabilities, those needed to compete and win in the future. These include a wide range of unmanned capabilities in the air, on the sea, and below the surface, as well as new capabilities enabled by directed energy, hypersonics, artificial intelligence, and advanced sensor systems.

Thank you for the strong support this Subcommittee has always provided our sailors and marines, and thank you for the opportunity to appear before you today. We look forward to answering your questions.

[The joint prepared statement of Secretary Geurts, Vice Admiral Merz, and Lieutenant General Berger follows:]

JOINT PREPARED STATEMENT BY SECRETARY JAMES F. GEURTS, VICE ADMIRAL  
WILLIAM R. MERZ AND LIEUTENANT GENERAL DAVID H. BERGER

Chairman Perdue, Ranking Member Hirono and distinguished Members of the Subcommittee, thank you for the opportunity to appear before you today to address the Department of Navy's (DON) shipbuilding programs. A lot has happened since the Navy last appeared before this Subcommittee, and we are excited to talk about the accomplishments of the workforce, the systems, and the processes that form our Navy and Marine Corps team.

First, thank you for the timely approval of the fiscal year 2019 Department of Defense budget. On-time receipt of fiscal year 2019 authorities and funding enabled the DON to expedite delivery of lethality, readiness, and cost savings through our ability to negotiate and award contracts earlier than planned. Such continued support by this committee and the Congress will ensure that the DON can execute our strategies with confidence, while providing the predictability to our industry partners that is critical to our joint success. Based on the stability afforded by a timely budget, our naval forces are on the right vector and, looking forward, remain focused on accelerating to scale in support of the National Defense Strategy.

The Navy and Marine Corps continue to face a dynamic strategic environment that is becoming ever more sophisticated, quickly evolving, and pushing the envelope of conventional technology. As detailed in the 2017 National Security Strategy and 2018 National Defense Strategy, in order to retain and expand our competitive advantage, it is imperative that the Navy proactively works to meet these challenges—and does so with a sense of urgency. The Navy and Marine Corps must remain ready at any time to answer the call and compete on a global scale. It is together as partners that the DON, industry, and this Congress can meet our mission to provide the right balance of readiness, capability, and capacity coupled with budget stability and predictability. The Department is prepared to use all authorities and tools at our disposal to ensure the Navy can sustain and improve our Service as required by the National Defense Strategy.

THE FISCAL YEAR 2020 PRESIDENT'S BUDGET REQUEST

As part of the Joint Force, the maritime dimension of the National Defense Strategy is to increase American naval power by building the *Navy the Nation Needs* and enabling our Marines to be lethal and resilient across all domains. The Fiscal Year 2020 President's Budget is effective in funding the increasing force needed to get to the 355 battle force ship requirement identified in the 2016 Force Structure Assessment. This year's plan includes procurement of 55 battle force ships within the Future Year Defense Program (FYDP) and rebalances service life extensions to produce a steady ramp to the aggregate goal approximately 20 years sooner than last year's plan. This steadier profile provides a predictable forecast for supporting acquisition programs and reform efforts in shipbuilding, maintenance, and personnel management. The Navy program provides flexibility given the dynamic threat environments captured in the 2017 National Security Strategy, 2018 National Defense Strategy, and further exemplified in the Chief of Naval Operation's Design for Maintaining Maritime Superiority 2.0. and concepts such as the Marine Expeditionary Advance Base Operations Concept. The Navy is responding to this dynamic competitive environment by iterating our warfare analysis and will complete an updated Force Structure Assessment by the end of 2019. This year's budget request is designed to provide adaptability, while maintaining alignment in acquiring the correct mix of ships and capabilities across all phases of warfare. This approach is wholly reliant on stable and adequate funding; any condition for which the Navy must execute its plan under the Budget Control Act or a continuing resolution, poses risk in erasing the momentum the Department has gained and would certainly be detrimental to this balanced approach.

Today, the Navy has 289 ships in its battle force inventory compared to the 282 that were sailing last year at this time, and by the end of the fiscal year end the Navy will have 296 in the inventory of the battle force. The 30-Year Shipbuilding Plan remains focused on utilizing the three principles of shipbuilding: (1) steady, sustainable growth; (2) aggressive growth based on opportunity; and (3) Service Life Extensions. The plan puts the Navy on a path to 314 ships by fiscal year 2024 and 355 ships by fiscal year 2034. The fiscal year 2020 President's Budget adds 12 more battle force ships with a total of 55 over the FYDP. The fiscal year 2020 request represents the largest shipbuilding budget request in over 20 years and includes: three *Arleigh Burke* destroyers; one guided-missile Frigate; three *Virginia*-class SSNs; two T-AO refueling ships; and two T-ATS combined towing, salvage, and rescue ships. The fiscal year 2020 request also accounts for the CVN 81 recently contracted with CVN 80 as part of a two-carrier buy. The plan promotes a stable and

efficient industrial base that encourages industry investment in capital improvements, capital expansion, and a properly sized world-class workforce. By setting conditions for an enduring industrial base as a top priority, working together with Congress, the Navy is postured to aggressively respond to more investment in any year.

In conjunction with the shipbuilding plan, the DON has developed a new Long-Range Plan for the Maintenance and Modernization of Naval Vessels. This plan complements the 30-year Shipbuilding Plan and Shipyard Optimization Plan and establishes the framework to effectively sustain our investments in today's fleet. It highlights the requisite development initiatives that will facilitate a more adaptable and reliable industrial base, while providing a foundation to support the workload forecasts of our industry partners. Tools like this are critical to the success of the Navy and will help us build a culture of continuous evaluation of the industrial base capacity and capability; enabling us to meet the requirements of well-laid plans and adapt to any surge demand if the situation arose.

As part of our enduring commitment to accelerating delivery of advanced capabilities to the warfighter in the most affordable manner, the Department continues its pursuits of acquisition and business process reforms. The DON is utilizing accelerated acquisition authorities previously provided by Congress to rapidly prototype and field innovative systems such as directed energy, missiles, and unmanned vessels.

The Department remains committed to the pursuit of strategically key capabilities and is continuously maturing our policies and processes to enable this progress. Streamlining contracting activities to optimize savings are seen in examples like the two-carrier buy resulting in \$4 billion in savings, the DDG Multiyear Procurement (MYP) saving \$700 million, and pricing options for the fiscal year 2019 LCS that took advantage of the recently awarded fiscal year 2018 LCS for over \$60 million savings. Additionally, the Navy is currently negotiating two other multiyear contracts—for *Virginia*-class submarines and Standard Missile-6 (SM-6)—that will save multiple millions more. The Navy will continue to use these, and other acquisition tools, to speed delivery of lethal capability to the fleet and at a reduced cost to the taxpayer.

As the DON accounts for a large percentage of the total domestic shipbuilding market, the timing of ship procurements is critical to the health and sustenance of the U.S. shipbuilding industry and has economic impact industry-wide. The growing logistics requirement in the context of Distributed Maritime Operations illuminates the challenges to recapitalize the auxiliary fleet, a key enabler for sustaining protracted medical, logistics, repair, command and control, and support missions. Because of industry dynamics over time resulting in an atrophied U.S. commercial industrial base, close partnering with industry and Congress is needed to recover the U.S. commercial market in order to competitively and affordably address the Navy's auxiliary shipbuilding requirement. Coincident is the review of the level of effort needed to distribute logistics into a contested maritime environment following safe transfer by the logistics fleet—smaller, faster, multi-mission transports likely resident within the future battle force. The DON is committed to maintaining a healthy and robust industrial base in order to meet the Nation's future needs. The 30-Year Shipbuilding Plan encourages industrial efficiencies and recognizes the criticality of protecting workforce skills in the U.S. shipbuilding industrial base so that in the long-term it can remain cost effective and meet the demands of the 355-ship *Navy the Nation Needs*.

After 40 years of a progressively smaller Navy, as we reverse the trend and rapidly grow, the Department faces additional challenges due to the increasing sustainment and logistics costs associated with owning and operating a larger fleet. Consistent annual funding in the shipbuilding account is foundational to sustaining predictable workload and capacity. Equally important will be properly phasing the additional funding necessary to operate and sustain the new ships as they are delivered—the much larger fiscal burden over time. The Navy is partnering with industry to define and establish workable requirements and working with Congress to sustain predictable profiles. These supportive relationships will continue to promote efficiency through capital improvement and expansion, research and development, and sustainment of a world-class workforce.

#### SUMMARY

It is imperative that the DON retain and expand our competitive advantage, as described in the 2017 National Security Strategy and National Defense Strategy. This budget recognizes the central role the U.S. Navy plays in our National Defense Strategy, and includes the largest shipbuilding dollar request in over 20 years. Continued congressional support of the Department's plans and budgets will help sus-

tain a viable industrial base of naval construction and repair, efficiently execute the National Defense Strategy, and ultimately ensure our military's capability, capacity, and readiness can continue to deliver superior naval power around the world, both today and tomorrow.

Thank you for your continued support of the Navy and Marine Corps and request your support of the fiscal year 2020 President's Budget.

Programmatic details regarding Navy and Marine Corps capabilities are summarized in the following section.

#### DEPARTMENT OF THE NAVY SHIPBUILDING PROGRAMS

##### SUBMARINES

Ballistic Missile Submarines, coupled with the Trident II D-5 Strategic Weapons System represent the most survivable leg of the Nation's strategic arsenal and provide the Nation's most assured nuclear response capability. Our nuclear deterrent must be modernized to remain credible—delay is not an option. As such, the *Columbia*-class program remains the Navy's number one acquisition priority program and is on track to start construction in October 2020 and deliver to pace the retirement of our current ballistic missile submarines, deploying for its first patrol in fiscal year 2031. To better align focus and resources and ensure successful delivery of this program to the Fleet, DON has established Program Executive Office *Columbia*. Additional resources above the Navy's topline will be required for the Navy to fund serial production of the *Columbia*-class SSBN and maintain its planned shipbuilding profile.

The fiscal year 2020 President's Budget supports the funding required to continue lead ship design and advance construction activities with a plan to achieve a target of 83 percent design completion at construction start, as compared to the 43 percent at start of *Virginia*-class. In September 2018 DON awarded the *Columbia* Lead Ship Advance Procurement / Advance Construction and Long Lead Time Material contract to General Dynamics Electric Boat for \$481 million. General Dynamics Electric Boat and Huntington Ingalls Industries-Newport News will procure component and commodity material based upon construction start and supplier lead times in order to support lead ship construction start in October 2020. The fiscal year 2020 President's Budget request also funds Continuous Production of Missile Tubes. This effort supports procurement of Common Missile Compartment material for U.K. *Dreadnought*-class submarines being executed under the Polaris Sales Agreement. The award was coordinated with the *Virginia*-class program to maximize efficiencies across the procurement of all large diameter tubes.

The Navy, the shipbuilders and related suppliers recognize that vigilance in the execution and oversight of the *Virginia* and *Columbia* programs is critical. In fiscal year 2020 the Navy will continue to utilize the \$225 million provided in fiscal year 2019 for industrial base support to align shipbuilder-procured material procurements with *Columbia*-class funding with funds budgeted for *Virginia*-class and CVN for common components and vendors. Additionally, the Navy is implementing Continuous Production on selected shipyard-manufactured items to reduce cost and schedule risk and help strengthen the industrial base with a focus on critical vendors. Advance Construction activities are set to start in June 2019 at General Dynamics Electric Boat and Huntington Ingalls Industries-Newport News to proactively manage schedule margin and reduce controlling path risks for *Columbia*.

The Tactical Submarine Evolution Plan is the Navy's long-term procurement strategy for submarines and payloads that paces evolutionary submarine design plans and processes to maintain undersea dominance. The Navy will be building on past success by awarding a Block V MYP contract for 10 ships in fiscal year 2019, with options for additional ships. Starting with the second ship in fiscal year 2019, these submarines will introduce the *Virginia* Payload Module and all Block V ships will have Acoustic Superiority. The fiscal year 2020 President's Budget supports the required funding to maintain a cadence of two-per-year *Virginia* construction established in fiscal year 2011 with Block III. Additionally, the fiscal year 2020 President's Budget includes a third *Virginia*, which will be an option ship on the multiyear contract.

##### AIRCRAFT CARRIERS

The aircraft carrier is the centerpiece of the Navy's Carrier Strike Groups and central to Navy core missions of sea control and maritime security. *Nimitz* and *Ford*-class carriers will be the premier forward-deployed asset of choice for crisis response and early decisive striking power in major combat operations for the next half-century. *Ford*-class CVNs are the first major design investment in aircraft car-

riers since the 1960s, providing a 33 percent increase in sortie generation rate, 2.5 times electrical generating capacity and a reduction in manning of approximately 600 manpower billets over *Nimitz*-class with a \$4 billion reduction in total ownership cost per ship compared to *Nimitz*-class.

The Navy continues to see progress in the testing of new systems aboard USS *Gerald R. Ford* (CVN 78). As of this January, CVN 78 has completed eight underway events and conducted over 700 catapult launches and arrestments with Navy jets, including over a hundred launches and recoveries in one day on two separate occasions. These fixed wing operations were successfully supported by a number of aviation systems, while others will require continued refinement as they continue to support ongoing shipboard testing. CVN 78 Post Shakedown Availability/Selected Restricted Availability is ongoing, and work continues on Advanced Weapon Elevator (AWE) construction and testing along with Advanced Arresting Gear reliability upgrades. The second of eleven AWEs was turned over to the ship's crew on February 14, 2019, and the joint industry and Navy team remain dedicated to achieving operational readiness of all elevators in the quickest manner. The *John F. Kennedy* (CVN 79) is over 53 percent complete with launch planned in late 2019 and delivery in the fall of 2024. When compared to CVN 78, CVN 79 is performing at an 18 percent man-hour stepdown. In January 2019 the Navy awarded the Detail Design and Construction contract for Enterprise (CVN 80) and CVN 81 as a two-ship buy realizing savings in excess of \$4 billion when compared to the Navy's single ship cost estimates.

The *Nimitz*-class Refueling Complex Overhaul (RCOH) is key to both the maintenance and modernization of each carrier in support of the second half of its service life. USS *George Washington* (CVN 73) will be halfway through her mid-life recapitalization in this summer with re-delivery to the Fleet planned for summer 2021. The RCOH is refueling the ship's reactors, modernizing its capabilities, and repairing ship systems and infrastructure. The USS *John C Stennis* (CVN 74) RCOH advance planning began in August 2018 with execution contract award planned for early 2021. The fiscal year 2020 budget eliminates the planned refueling of USS *Harry S Truman* (CVN 75) which was scheduled to begin in March 2024. This decision saves \$3.4 billion in the FYDP, and saves more than \$1 billion per year from operations, maintenance, manpower, and aircraft. These savings provide an opportunity for the Navy to invest in advanced and distributed systems that will shape future naval warfare to expand our competitive advantage.

#### LARGE SURFACE COMBATANTS

The *Arleigh Burke*-class (DDG 51) program remains one of the Navy's most successful shipbuilding programs with 67 ships delivered to the Fleet. The fiscal year 2018–2022 MYP maximizes affordability and stabilizes the industrial base. These Flight III ships will provide enhanced Integrated Air and Missile Defense with the AN/SPY 6(V)1 Air and Missile Defense Radar (AMDR) and AEGIS Baseline 10. AMDR meets the growing ballistic missile threat by improving radar sensitivity and enabling longer range detection of increasingly complex threats. The program demonstrated design maturity through its successful completion of all developmental testing. AMDR is in production and on schedule for delivery with the first Flight III ships. The President's Budget funds the procurement for two ships as part of the MYP contract, plus a third Flight III DDG 51 that will be awarded as an option ship.

Complementing the DDG 51, the DDG 1000 *Zumwalt*-class guided missile destroyers are optimally crewed, multi-mission surface combatants designed to provide long-range, offensive surface strike capabilities. The DDG 1000 ship continues to complete activation and test of its combat systems in its homeport of San Diego. DDG 1001 was commissioned on January 26, 2019, and is starting the process of combat system activation and test. Construction on DDG 1002 is over 83 percent complete at General Dynamics Bath Iron Works.

In the fiscal year 2020 budget request, the Navy has budgeted \$71 million of Research and Development funding for the Large Surface Combatant (LSC). These funds will be used to conduct additional conceptual refinement and preliminary design that will lead to a system requirements review in fiscal year 2020. The LSC will be a new acquisition program that will leverage the DDG 51 Flight III combat system while identifying and evaluating the integration of non-developmental mechanical and electrical systems into a new or modified hull design, incorporating platform flexibility and growth opportunities to meet future Fleet requirements. The Navy intends to evaluate capability areas for integration into the initial LSC baseline that will result in increased flexibility and adaptability features allowing for more rapid and affordable upgrades over the ships' service life.

The Navy will continue to partner with industry to develop and refine requirements for the LCS over the next year. This joint effort will result in a stable requirements baseline and a ship that will have been designed for producibility as well as the flexibility noted above.

#### SMALL SURFACE COMBATANTS

The 2016 Force Structure Assessment revalidated the warfighting requirement for a total of 52 rotationally-crewed small surface combatants, including the Littoral Combat Ships (LCS) and the future, more capable Guided Missile Frigate (FFG(X)). Since last year the DON has worked with industry to ensure full understanding of the requirements for FFG(X), mature design proposals, and seek areas to reduce overall cost and risk. Our requirements for the class are mature, and were approved by Joint Requirement Oversight Council on February 11, 2019. The Navy released a draft Request for Proposal (RFP) on March 1, 2019—ahead of schedule—and will release the FFG(X) RFP for Detail Design and Construction in the fourth quarter of fiscal year 2019. Having multiple offerors compete will ensure competitive pricing and enable the Navy to select the best value design.

The LCS program is funded for 35 ships, 17 of which have delivered. Of these, four are dedicated test ships, eight are Surface Warfare (SUW) ships, eight are Anti-Submarine Warfare (ASW) ships, and 15 are Mine Countermeasure (MCM) ships. The Navy is beginning to retrofit an Over the Horizon Weapon System (OTH WS) on all LCS for increased lethality. The award in May 2018 of the Naval Strike Missile contract for OTH WS brings a technologically mature weapons system and extends the offensive capability of the ship.

The Navy achieved Initial Operating Capability (IOC) of the final component of the SUW Mission Package (MP), the Surface to Surface Missile module. The Navy worked with the Director, Operational Test and Evaluation to improve the test design, employ best practices, and make data driven decisions. The team jointly delivered a fully compliant test outcome, while simultaneously reducing the number of developmental test and operational test raid events. As a result, the Department reduced costs while completing operational tests of the SUW MP two months early. The ASW Mission Package Pre-Production Test Article was delivered in November 2018 and ASW MP conducted end-to-end testing at the Navy’s Atlantic Undersea Test and Evaluation Center in January 2019. All of the MCM Mission Package aviation systems have reached IOC and are being delivered to the Fleet. The modular nature of the Mission Packages enables the Navy to deliver these capabilities now, while continuing to mature the remainder of the systems. Additionally, the Navy continues to evaluate employment of the MCM Mission Package off of Vessels of Opportunity.

#### AMPHIBIOUS SHIPS

LHA 6 *America*-class ships are flexible, multi-mission platforms and will replace the aging LHA 1 *Tarawa*-class ships and LHD 1 *Wasp*-class ships. USS *America* (LHA 6) deployed as the centerpiece of *America* Amphibious Readiness Group/Marine Expeditionary Unit, while USS *Tripoli* (LHA 7) is expected to get underway for sea trials within the next few months with delivery planned for later this year. Fabrication has begun on 71 of 216 units that will combine to shape LHA 8 in support of fiscal year 2024 delivery. LHA 8 will include a well deck to increase operational flexibility and includes a reduced island structure that increases flight deck space to enhance aviation capability. All LHAs will be F-35B capable.

The *San Antonio*-class (LPD 17) provides the ability to embark, transport, and land elements of a landing force by helicopters, tilt rotor aircraft, landing craft, and amphibious vehicles. The future *Fort Lauderdale* (LPD 28) is 44 percent complete and planned for delivery in September 2021, while the future *Richard M. McCool Jr* (LPD 29) started fabrication in July 2018. LPD 28 and LPD 29 leveraged many design innovations and cost reduction initiatives, including the first install of the Enterprise Air Surveillance Radar (EASR) on LPD 29, as the class transitions to the second flight of high-level capabilities. The Navy intends to place the first Flight II ship, LPD 30, on contract by summer of 2019.

The future amphibious force structure and composition will be evaluated as part of the larger ongoing Force Structure Assessment.

#### AUXILIARY SHIPS, EXPEDITIONARY, AND OTHER VESSELS

Support vessels such as the Expeditionary Sea Base (ESB), and the Expeditionary Fast Transport (EPF) provide additional flexibility to the combatant commanders. ESBs are flexible platforms capable of hosting multiple mission sets with airborne and surface assets. The USNS *Hershel “Woody” Williams* (ESB 4) delivered in Feb-

bruary 2018 and ESB 5 is scheduled for delivery in November 2019. ESB 6 and ESB 7 are scheduled for contract award in fiscal year 2019, with delivery in fiscal year 2022 and fiscal year 2023, respectively. The Navy accepted delivery of the 10th EPF this past November. EPF 11 and EPF 12 are under construction with deliveries planned in fiscal year 2019 and fiscal year 2020, respectively. The final two EPF's have an agreement in place, and will award this spring with delivery planned in fiscal year 2022.

The Combat Logistics Force (CLF) consists of T-AOE fast combat support ships, T-AKE dry cargo and ammunition ships, and T-AO fleet replenishment oilers. CLF ships fulfill the vital role of providing underway replenishment of fuel, food, repair parts, ammunition and equipment to forward-deployed ships and embarked aircraft, to enable them to operate for extended periods of time at sea. The *Kaiser*-class (T-AO 187) fleet replenishment oilers will be replaced with the *John Lewis*-class fleet replenishment oilers, designated T-AO 205-class. Construction of the first T-AO 205 started in September 2018 and construction of the second ship will begin in July 2019. The fiscal year 2020 budget request includes two T-AO 205 ships.

The Department will begin construction this summer of a combined towing, salvage, and rescue (T-ATS) ship to replace the four T-ATF 166-class fleet ocean tugs, which reach the end of their expected service lives in 2022, and the four T-ARS 50-class salvage ships, which reach the end of their expected service lives in 2025. Two T-ATS are included in the fiscal year 2020 budget request.

While by law icebreaking is a Coast Guard mission, the Navy and Coast Guard established an Integrated Program Office in 2016 to rebuild the Nation's heavy icebreaking capability. The Navy is supporting the Coast Guard's efforts to recapitalize the heavy polar icebreaker fleet on an accelerated schedule. The Navy/Coast Guard team plans to award the detail design and construction contract this Spring to support delivery of the first Polar Security Cutter as early as 2023.

#### READY RESERVE FORCES (RRF)

The Navy has begun the first steps in executing its sealift recapitalization plan called *Sealift that the Nation Needs* that was coordinated with the Office of the Secretary of Defense, U.S. Transportation Command (USTRANSCOM), and the Department of Transportation's Maritime Administration. This three-phased approach includes the Service Life Extensions of select Surge Sealift vessels, acquiring used vessels, and a new construction, common-hulled shipbuilding program. The Navy's long-term strategy recommends assigning new construction common hull vessels to the Maritime Prepositioning Force (MPF) as delivered, ensuring the Fleet has the latest capabilities to support employment across the full range of military operations. Existing MPF ships would rotate to surge, preserving capability and maintaining the requisite square footage to meet USTRANSCOM sealift capacity requirements.

#### SUSTAINMENT, MODERNIZATION AND SERVICE LIFE EXTENSIONS

The fiscal year 2020 Long-Range Plan for the Maintenance and Modernization of Naval Vessels forecasts all in-service maintenance ship-class workloads required to sustain the fleet over the next 30 years as it grows to 355 battle force ships. The intent is to provide stability and identify shortfalls within the public and private new construction and ship repair industrial base. The four key enablers the Navy is addressing to efficiently maintain and modernize the Navy's growing fleet are: the industrial base capacity and capability, shipyard level loading, workforce training, and facilities investments.

The fiscal realities facing the Navy make it imperative to maintain our in-service ships to achieve their expected service lives and also extend the service lives through modernization efforts. The fiscal year 2020 President's Budget includes funding for the modernization of four destroyers to sustain combat effectiveness, ensure mission relevancy, and achieve the full expected service lives of the AEGIS Fleet. The Navy and industry are collaborating on innovative approaches to conducting modernization of cruisers and dock landing ships.

Service life extensions can be targeted, physical changes to specific hulls to gain a few more years, or a class-wide extension based on engineering analysis. The Navy has evaluated the most effective balance between costs and capability to be the class-wide extension of the DDG 51 class to 45 years and targeted refueling of *Los Angeles*-class attack submarines.

The Navy is implementing changes recommended from the Comprehensive Review that followed the incidents on USS *McCain* and USS *Fitzgerald*, including implementing common bridge designs and installing common equipment across the fleet. At the same time, the Navy is procuring and installing the Next Generation Surface

Search Radar in as fast and efficient a manner possible. New ship classes, like the FFG(X), will be built from the ground up with this common capability.

#### UNMANNED VEHICLES

Unmanned systems continue to advance in capability and are anticipated to be key enablers through all phases of warfare and in all warfare domains. The Navy is using a Family-of-Systems strategy to develop and employ unmanned surface and undersea capabilities that augment and relieve stress on the manned force and increase the cost imposed on our competitors. In fiscal year 2019 the Navy will commence low rate production of a modular Mine Countermeasures Unmanned Surface Vehicle (MCM USV) and issue an RFP for a medium unmanned surface vehicle (MUSV) to provide distributed sensing capacity to the surface force. The fiscal year 2020 budget initiates the Large USV (LUSV) program to provide distributed lethality as a part of the Future Surface Combatant Force. In the undersea domain, the Navy has commenced fabrication of Orca Extra Large Unmanned Undersea Vehicle (XLUUV) and will soon complete the design of the Snakehead Large Displacement UUV (LDUUV). In fiscal year 2020 the Navy will issue competitive RFPs for initial production of Snakehead LDUUV and Razorback environmental sensing UUVs, and production of Knifefish mine countermeasures UUV. In support of these new capabilities, the Navy is also investing in enabling technologies, such as artificial intelligence, machine learning, energy, and payloads, as well as establishing the interoperable standards and open architectures for ease of technology transition. These technologies and standards are the foundation necessary to ensure integration and transition to the fleet using a disciplined approach.

The Navy has undertaken an aggressive approach through competitive prototyping in collaboration with industry to accelerate these new technologies utilizing the all the new authorities granted over the past few years such as middle tier acquisitions and acquisition agility legislation. This is affording the Navy the ability to prudently prototype, experiment, and demonstrate new capabilities prior to commencing with Programs of Record. Unmanned vessels are key elements in the future naval force and the Navy fully intends to leverage the progress to date to inform new concepts of operation, new means of integrating unmanned and manned vessels, and new capabilities afforded by these advances.

#### COMBAT SYSTEMS

The Department continues to field the most capable and lethal surface and submarine combat systems in the world. The AEGIS Combat System Baseline 9 has been fielded on cruisers and destroyers and continues to deliver unprecedented offensive and defensive capabilities, including offensive strike and ASW, and simultaneous air and ballistic missile defense on destroyers and Air Defense Commander capability on cruisers. AEGIS Baseline 10 will incorporate the AN/SPY 6(V) AMDR providing significant performance improvements over the AN/SPY 1D(V) radar and expanding the sensor coverage and enhancing the Navy's ability to perform the Integrated Air and Missile Defense mission. The Navy is leveraging the investment in AMDR to produce the EASR that will become the primary Air Search Radar for carriers, amphibious ships and the guided missile frigate. The use of a common design and support strategy will enable significant life cycle efficiencies in maintenance support, training, and overall cost for the Navy's primary surface ship radars.

The Department continues to aggressively pursue affordable systems that are employable from multiple platforms. Under the Surface Electronic Warfare Improvement Program (SEWIP), the Navy is replacing aging analog electronic warfare systems first fielded in the early 1970's with new, digital systems. SEWIP Block 1 and 2 systems are in Full Rate Production and continue to be installed across the fleet. The SEWIP Block 3 program completed its Milestone C in December 2018 and has begun Low-Rate Initial production of this new capability. The Navy continues to deliver enhanced surface Undersea Warfare capability through the AN/SQQ-89A(V)15 aboard cruisers, destroyers, and LCS Mission Packages, and the Ship Self-Defense System provides ships with greater capability to defend against anti-ship cruise missile attack and supports a myriad of mission areas on carrier and amphibious ships.

The Navy continued to equip its submarines with the ever-evolving undersea combat system utilizing bi-annual hardware Technology Insertions on even years and software Advanced Processing Builds on odd years. This process leverages commercial off-the-shelf (COTS) technologies via the Acoustic Rapid COTS Insertion (ARCI) program mitigates COTS obsolescence while providing more capability improvement at lower costs.

## MISSILE PROGRAMS

SM-6 missiles provide theater and high value target area defense for the Fleet, and with Integrated Fire Control, has more than doubled its range in the counter-air mission. SM-6 Block I declared Full Operational Capability in December 2017 and the Navy plans to award a five-year MYP contract for up to 625 SM-6 missiles this summer. The fiscal year 2020 President's budget also includes funding for the upgraded SM-2 Block IIIC and the SM-6 Block IB missiles, both are rapid prototyping pathway middle tier acquisition projects. The SM-6 Block IB seeks to provide an extended range capability in response to Joint, Fleet and Navy Urgent Operational Needs.

The Evolved Sea Sparrow Missile (ESSM) provides another layer to the Navy's defended battle-space. ESSM Block 2 is on track to achieve IOC for AEGIS platforms in fiscal year 2020 and Ship Self-Defense System platforms in the 2022-2023 timeframe.

The inner layer of the Fleet's layered defense is the Rolling Airframe Missile (RAM) designed to pace the evolving anti-ship cruise missile threat and improve performance against complex engagement scenarios. The RAM Block 2 successfully achieved a Full Rate Production decision in November 2018.

## EXPEDITIONARY WARFARE

The Navy and Marine Corps team provides the combatant commanders and our Nation the options needed to engage with our partners, to deter our adversaries and, when needed, to fight and win. That capability is underpinned by our disciplined, well-trained and motivated sailors and marines equipped with amphibious ships, aircraft and weapons in our arsenal. The Marine Corps execute their mission under the principle of Expeditionary Warfare: to operate forward, to exploit the seas as maneuver space as a base for global power projection, and to be ready to maneuver to shore when so ordered. Our ability to deploy from the sea in austere environments at a time and place of our choosing gives us significant tactical, operational and strategic advantages over potential adversaries. That ability is provided through the combination of connectors that move forces from the sea base to the objective sites and sustain the organic capability of those forces to maneuver and fight on the objective.

Tactically, the ability to project multiple elements of a landing force ashore via multiple entry points using both vertical and surface means gives us greater flexibility in maneuvering into positions of advantage over an adversary.

## CONNECTORS

Marine Corps operations require the movement of personnel, equipment and supplies, from the sea base to the objective and it is connectors that are critical enablers for any naval force by closing the last "tactical mile" with the adversary. Modern aerial connectors are the vertical component, such as the MV-22 Osprey and CH-53K King Stallion, extend operational reach and lift capacity, revolutionizing our ability to operate from the sea, austere locations, and previously damaged airfields within a contested environment. The Navy and Marine Corps also require a surface connector and is in the process of modernizing the connector fleet by replacing the aging Landing Craft Air Cushion (LCAC) and the 50-year-old fleet of Landing Craft Utility (LCU). This system of surface and aerial connectors will enable the Joint Force to establish a web of sensor, strike, decoy, and sustainment locations based on land and sea that complicates the strategic and operational decision-making of our most advanced rivals by defeating any Anti-Access/Area Denial operations. Continued funding of the modernization, maintenance, and service life extension programs of our existing fleet of connectors is critical to enabling our success in future security environments.

The Ship to Shore Connector program will replace aging LCACs, which have undergone a Service Life Extension Program (SLEP) and a Post-SLEP Extension program. Additionally, the fiscal year 2020 President's Budget includes the procurement of 20 LCU 1700-class craft across the FYDP, which will recapitalize, in part, the aging LCU 1610-class. These platforms are essential in connecting the combat power and logistics sustainment of the sea bases to the expeditionary forces operating at the tip of the spear.

Senator PERDUE. Thank you, sir.

We will now start the round of questioning. We will do 5 minutes in the first round, and then time allowing, we will go into poten-

tially a second round. I will start off and then we will move to Senator Hirono.

Secretary Geurts, following up on my opening statement today—and you referred to it in yours as well—regarding budget stability, in a private conversation you have said this is a key success factor to our Navy and Marines out there today. The Secretary of the Navy also stated in testimony that a return to sequestration in fiscal year 2020 could mean a \$26 billion cut to the Department of the Navy, and he provided a graphic. I think at each of our places this graphic is here. Thank you for that. Showing the impact of what that would mean in the procuring of six new ships and in the operation of our Navy and Marine Corps.

Would you talk about the impact of that potential Budget Control Act, which is the law of the land? If that were to really take place, what would that do to our procurement plan?

Also as an adjunct, I would like each of you, if you have a comment, to talk about how CRs impact your area of responsibility. We have had 2 years now where we have avoided them. We are half-way through this fiscal year and we are facing the gun barrel right now of another potential for a CR September 30th of this year. I would like you to tell this Subcommittee how dangerous that could be for your area of operations.

Secretary GEURTS. Yes, sir. I will start out and then ask my two compatriots here to give their perspective.

From the Budget Control Act, it would be devastating. We have really done well by having smooth, efficient production lines well planned out. All the work we have done over the last couple years would be completely devastated if we went into Budget Control Act, one, because of the magnitude of the act, and then it is further compounded because we would have to apply that, under normal circumstances, to each line item, which means each individual ship, since they are line-item appropriated. The dollar amount would be devastating. The impact would actually impact every ship because we could not actually even balance the dollars as we go forward.

So as we look at that from a shipbuilding perspective, all we have done to get out of the boom and bust and have a repeatable, efficient, effective program plan would all be kind of thrown in there. As we have seen, it has taken us decades to recover from gaps we had in submarine construction from Katrina impacts. You would essentially undo everything we have done over the last couple years to rebuild the Navy in an efficient manner.

Senator PERDUE. Is it safe to say that future acquisition costs would go up?

Secretary GEURTS. Yes, and it is not just acquisition. It will also be on the readiness and the maintenance.

On the CR impact, if I look over the last 10 years, by my accounting the average is we have been about a third of the year in a CR as an average over the last 10 years. What does that draw? That draws huge uncertainty.

I mean, I can talk about it at the program level. I would ask General Berger and Admiral Merz to talk about it kind of at the deckplate level.

But with that uncertainty, then I have to create multiple versions of contracts. Everything we are doing on ship maintenance

to move planning early gets thrown out because now you have to continually replan. We did 258,000 contracts last year in the Department of Navy, \$110 billion worth of work. They will now have to do that once, twice, three times.

Then in particular with the 2020 budget where we have got increases in ship counts, those will all have to be rolled back. Increases in personnel to man the ships we are fielding—those will all be impacted. New starts like our new frigate—all of that would have to go on hiatus.

The real issue is uncertainty. If you knew it was going to be for 82 days, you could plan around that. You do not know when the CR is going to end, so you are kind of in an endless replan.

I would ask my two teammates here to provide their input.

Senator PERDUE. Yes. We have about a minute left. We will come back to this later if we need more time, but I would like to hear from these two commanders as well.

Vice Admiral MERZ. Yes, sir, Mr. Chairman. I will speak quickly here.

I think Secretary Geurts covered it. But in the simplest terms, it impedes virtually every area of our operation, and it is a crushing impact on morale for the forward-deployed force.

Under your oversight, we applied industry best practices and we have tried to improve our efficiency. We found the impacts even worse than we thought. Unfortunately, we have real data here over 10 years of CRs. This is not anecdotal. Through the renegotiation of about 10,000 contracts, a 6-month CR in 2018 costs us \$5.8 billion in buying power. In real terms, that is the equivalent of about three destroyers that we were unable to execute.

There is a GAO report in March that reinforces our assessment. The impacts I think as Secretary Geurts covered, for fiscal year 2020, but a loss of \$2 billion of reprogramming or shifting funding to the Military Personnel (MILPERS) accounts, \$4 billion in operations and maintenance, nearly another \$6 billion in shipbuilding that we will be unable to execute.

So last year, we have seen a return to good behavior and the high productivity. We got away from the bad short-term behavior, what we call survival tactics. We just cannot go back if we expect to win.

Senator PERDUE. General Berger?

Lieutenant General BERGER. Sir, it is an oversimplification, but I think at the title X level where we work, we are going to trade modernization to pay for readiness because that is what we must do. All the progress that they noted that we have all seen with on-time budgets goes backwards because we will absolutely make sure the next units to deploy are ready to go, as we have in the past.

At the unit level where I came from in August, just 30 seconds on that where Senator Hirono and I first met. Those commanders out there plan their whole training and education plan, their deployments, their exercises based on the budget they think they are going to get. It is not even flow over 12 months. If they do not know, if they go into sequestration or a CR, that unpredictability the Secretary mentioned at their level—they do not know whether they are going to Thailand or the Philippines or Australia or whether they can afford that. They have to write the contracts.

They have to lay in the airlift a couple months in advance. We lost a lot of money when we were in a CR buying airplanes, scheduling maintenance, laying contracts in for things that did not happen.

Senator PERDUE. To put it bluntly Russia and China do not face this sort of financial constraint with regard to their planning. Is that correct?

Lieutenant General BERGER. I am not qualified to answer that. I just know the impact it has on us. It is not good.

Senator PERDUE. Thank you.

Senator HIRONO?

Senator HIRONO. Thank you very much, Mr. Chairman.

I appreciate the fact that you continue to focus on the damage done by CRs, and in fact, some of you probably know that the Chairman and I were part of a joint House-Senate special committee to address the budget and appropriations issues, and both of us shared the concern about continuing to resort the CRs. But we were not able to come to a resolution or appropriate recommendations, which just goes to show how intractable this problem is. But certainly putting a large part of the base budget into OCO funds is not the answer either.

I want to get to the public shipyard modernization issue, Secretary Geurts, because that is something that, as you know, I have been really focused on.

I do applaud the Navy for establishing a plan for modernizing the public shipyards because up to now, we have been in, pretty much, fits and starts without a comprehensive plan.

Does the Navy's fiscal year 2020 budget fully fund the shipyard modernization plan? Because the fiscal year CNO's unfunded priority list is silent on shipyard modernization. I want to know whether you are fully funded to do what you—

Secretary GEURTS. Yes, ma'am. It is fully funded. We have put a lot of resources in it. Just to foot stomp your issue, the average age of our dry docks across all of our yards is 62 years old. That is just one element of where we need to modernize the shipyard, both recapitalize that, as well as recapitalize equipment and facilities.

Senator HIRONO. Yes. We know that there are major needs for modernization. So I just want to be assured that you actually have money to proceed with that.

Are you considering any changes to the plan to accelerate specific capability expansion or specific productivity enhancements in view of the ship maintenance problems that you are facing?

Secretary GEURTS. Yes, ma'am. We are working to look at that. The shipyard plan kind of has three major lines of activity. One is recapitalizing dry docks. The second is productivity improvements by re-laying out the yard. We believe that will get us 65 percent more efficiency just in terms of moving workers closer to the work. The third is recapitalizing tools and machinery in the shipyards themselves. All three of those are underway.

Additionally, we have started master planning, and so at Pearl Harbor in particular is our first where we have hired a master planner to help work through the details. We are going to do that in all four of the yards to work through all the detailed planning

of how exactly to lay out the yard to get us to the efficiency we want.

My end goal is as the number of ships goes up, we get the efficiency in the public yards so that we stabilize the workforce there, we can deliver the increased demand through efficiencies in the yard versus having to hire additional folks to meet that growing demand in the out-years.

Senator HIRONO. Well, you also face the challenge of having workers who are retiring in large numbers, and you have a lot of people in the shipyards who are doing the necessary work with fewer than 5 years of experience. So there is that. You can move the people closer to where the work is to enhance the efficiencies, but you have the overall concern about where the workers are coming from.

Secretary GEURTS. Absolutely.

Senator HIRONO. What are you doing on that—

Secretary GEURTS. Yes, ma'am. We have accelerated our hiring, and so we are at the level of workforce, 36,700, we want in all the four public yards. We have achieved that a year early. As you indicate, about 57 percent of those right now have less than 5 years experience. We are employing a whole host of technologies, apprentice programs, and they are taking best practices from around the world to get that workforce trained, capable, and stable so that as we improve the facilities, we will leverage the foundation of a strong workforce that we have put in place.

Senator HIRONO. I have been to our apprenticeship programs, and I am seeing more women getting into those programs. Is that a potential source of really good workers? Are you doing any kind of particular outreach to women to work in our shipyards?

Secretary GEURTS. Yes, ma'am. I will have a follow-up to give you kind of a more specific answer to that. I would say in the time here, we are looking for the best workers and fully leverage diversity wherever they come from. It is a great opportunity to help the Nation out. They are stable, really important jobs for us, and we are looking to actively recruit and maintain that workforce.

Senator HIRONO. I look forward to talking with you more about that.

[The information referred to follows:]

Secretary GEURTS. The public shipyards engage in a number of efforts to attract women candidates to the workforce. These efforts include partnering with professional organizations tailored toward women such as the National Association of Women in Construction, Society of Women Engineers, Women in Technology, and other local organizations (e.g. Patsy Mink Center for Business and Leadership) to reach as many women as possible. In an effort to boost the number of women applicants, female shipyard workers, including female apprentice program graduates, are encouraged to represent the shipyards and lead recruiting efforts at local job fairs and other outreach events. At Pearl Harbor Naval Shipyard (PHNSY) specifically, the shipyard has stood up a Barrier Analysis Team to analyze triggers and identify barriers to the employment of females in non-traditional occupations and to the advancement of women in high grades and leadership positions. As well, PHNSY is working to improve access for women in all areas of the base, including its Nursing Mothers Program by updating its workplace support policy and adding additional lactation locations.

Moving on, for either you, Mr. Secretary, or Admiral Merz, the Navy is requesting funds for three *Virginia*-class boats—I know my time is almost up, but could I finish my question—in fiscal year

2020 instead of the two planned for fiscal year 2020 at this time last year. The Navy budget justification material says that since the normal advance procurement funds were not budgeted before now, the third boat in the fiscal year 2020 request will not begin construction until fiscal year 2023.

I would also note that last year, the Navy's 30-year shipbuilding plan through 2048 did not ramp up production of three *Virginia*-class boats at all. This year, the Navy's 30-year shipbuilding plan includes the third boat in fiscal year 2020 but does not include a third boat in any other year in the 30-year plan. It is a little bit mystifying to me.

I can understand that you would request advance procurement for an additional attack submarine in fiscal year 2020, but why would you ask for full funding for a boat that cannot be built in fiscal year 2020?

Secretary GEURTS. Yes, ma'am. I will start out, and if Admiral Merz wants to jump in or we can come back around to it.

As we discussed last year in the committee, our biggest shortfall in your opening statement as well noted is in attack submarines. That situation will get worse before it gets better. We are looking for any opportunity to accelerate that versus the other fleets we had, and while normally we would have just done the advance procurement, since this is outside of the block buy and because of the criticality of adding the submarines and trying to get that left of the *Columbia* production ramp-up, we chose to fully fund that in 2020 when we made the hard decision to fully fund that in 2020 versus over a couple of years.

Senator HIRONO. Okay. I may have further questions. But thank you, Mr. Chairman.

Senator PERDUE. Senator Hawley?

Senator HAWLEY. Thank you, Mr. Chairman.

Thank you, gentlemen, each of you, for being here today.

Let me start with the 355 ship target, which I understand is a result of the force structure assessment in 2016. Is that correct, Mr. Secretary? Admiral, I will direct it to you.

Vice Admiral MERZ. Yes, sir, it is.

Senator HAWLEY. Now, I understand, based on testimony last year, that the Navy is currently looking again at the force structure assessment and updating that, Admiral. Is that correct?

Vice Admiral MERZ. We are and that will be completed by the end of the year.

Senator HAWLEY. Completed by the end of this year.

I wonder if you can give us a preview. I mean, a lot has changed since the last force structure assessment was finished. I am thinking of, in particular, the National Defense Strategy, which represents a significant shift, obviously strategically and otherwise. Can you give us some thinking on how the NDS may impact the force structure assessment update and where you are on that?

Vice Admiral MERZ. Yes, sir. I have not had a preview of the force structure assessment, but I can certainly comment on some of the complex variables we are inserting into the ongoing assessment.

We typically do a force structure assessment every 2 to 3 years. The services are about 2 to 3 budget cycles. It is driven by a signifi-

cant change in threat, a change in guidance as the National Defense Strategy, which actually covers both. Then we work it through with the combatant commanders, the Operating Plan (OPLAN) analysis, the campaign analysis. It is typically founded on the capabilities we have on how we would fight with the projection into the future. It does not typically identify new capabilities we need, best employment of what we have or what we are projected to have.

Some of the things we have entered into a churn of this force structure assessment is the shift—I will say shift back to distributed maritime operations, which is very reflective of a peer or near-peer type of competition we might face. Along with that came a recognition that we will likely have to change force mix, not necessarily types of ships, but the numbers on either side; a strong look at logistics on how we would support a distributed maritime operation. We just finished the sealift report on 18 of March, and that showed that the sealift requirement is about correct, but how we distribute that into a contested environment is under review and that will be part of the assessment.

All that has created quite a few moving parts for this force structure assessment. We were asked recently do we expect the number to go up or down. I certainly do not expect it to go any lower. I would not be surprised if it goes up on several categories.

Senator HAWLEY. Thank you very much.

Let me ask you about modernization. China, obviously, a major focus, the major focus perhaps, of the NDS. We know that China is in a rapid buildup of sea power. It can exceed 400 ships by some estimates soon. The statistic that is perhaps more alarming to me, however, is the statistic that at least as of 2017, 70 percent of China's navy was considered modern, outfitted with the latest technology, including AI.

Can you give us some visibility, Admiral, into steps that the Navy is taking to make sure that our fleet is not only large, of sufficient size, but also that we are, indeed, incorporating the latest technologies, including AI and others, to make sure that we are on equal footing or better than our Chinese counterparts?

Vice Admiral MERZ. Yes, sir. Not surprising, it will be somewhat of a similar answer.

On the front end of our assessment are the OPLAN analyses by the combatant commanders who keep a very close eye on the threat. I will tell you we are very impressed with China's commitment to modernization, their commitment to maintenance. Maybe some insight to the Chairman's question on them, do they face the same type of budget constraints? We do not know but we do know they follow our models and in some cases are executing better than we are. This is part of our recovery and our recommitment.

Artificial intelligence, machine learning, this all goes into how we would employ the force, and it will have an impact on the type of force that we buy.

Some of these vectors are a little bit hard to track now. A lot of this technology is very new. But along with the last force structure assessment, the defense committees also directed us to do an additional assessment. Every single one of them has identified the new technologies we have to pursue, open the aperture, more distrib-

uted lethality, cost-imposing, attritable, which includes machine learning, artificial intelligence.

All these factors are coming together for a reevaluation of how this force mix might look.

Senator HAWLEY. Thank you very much.

Thank you, Mr. Chairman.

Go ahead, Mr. Geurts.

Secretary GEURTS. If I could just add in we are absolutely, I would say, on the acquisition technology side really focused on how do we stream new capabilities into both our existing fleet and future fleet much more quickly. There are some really exciting stuff on architecture, and whatnot. Perhaps I can give you an update on that in a little more detail because we are really—I would say the Navy is on the front end of bringing new capabilities into ships much more quickly, and I can probably give you some examples of that.

Senator HAWLEY. I would appreciate that. Thank you.

Thank you, Mr. Chairman.

[The information referred to follows:]

Secretary GEURTS. Overall, the Navy has taken an evolutionary approach to introducing new capabilities to the fleet. Examples include: AEGIS Virtual Twin (VTwin)—Developed in under 14 months, the AEGIS VTwin uses cutting edge technology to run the AEGIS Weapon System code in a fraction of the original hardware space. In March 2019, the system successfully detected, tracked, and intercepted a cruise missile target off the coast of Virginia. This first-ever event proves that a virtualized version of the Navy's premier weapon system matches the performance of legacy hardware while enabling the Navy to rapidly deliver software updates and new capabilities. Navy will transition the AEGIS VTwin into the AEGIS Virtual Combat Management System, field in additional Destroyers, and shrink the timeline to field warfighting power. Using the AEGIS VTwin we successfully intercepted a live at sea aerial target on March 25 from the USS *Thomas Hunder* (DDG 116). This was done after an unsuccessful intercept the previous day as a result of a software configuration error. After analysis quickly determined the root cause, a fix was developed, verified, approved, and installed back in the AEGIS VTwin aboard the USS *Thomas Hunder* (DDG 116) the next morning, allowing for the successful target engagement. This sequence of events demonstrated how virtualization allows us to quickly analyze, fix, and deliver new capability to the Fleet. Unmanned Maritime Autonomy Architectures (UMAA)—UMAA standardizes the payload and sensor autonomy interfaces allowing commonality and re-use. The objective of this initiative is to reduce cost for subsequent acquisition programs while accelerating autonomous advancements to the fleet. The UMAA is being developed in fiscal year 2019 and fiscal year 2020 with broad industry participation which leverages prior standards work. These standard interfaces do not replace autonomy solutions, but seeks to enable re-use of autonomy development across all unmanned systems. Solid-State Laser Technology Maturation (SSL-TM) Demonstration—The Navy has identified laser weapons as an urgent capability need and is moving rapidly to deploy advanced laser capabilities to the fleet. Under the SSL-TM research program, the Office of Naval Research will be executing an at-sea demonstration on USS *Portland* (LPD 27). This 150kW laser can be used in defense of small boats and drones and has counter-C4ISR capabilities as well. Ships—Ships are produced with Space Weight and Power margins to accommodate future capabilities. Some of our most successful programs are making evolutionary transitions to provide improved capability. The Navy has developed three primary capability evolution plans (Surface, Tactical Submarine, Amphibious Warfare) outlining capability improvement areas to guide the Navy and industry in managing the timing of block improvements. Some examples of recent and ongoing transitions are DDG 51 Flight III, Virginia Block V, LPD Flight II, LHA Flight I and FFG(X).

Senator PERDUE. Senator King?

Senator KING. Thank you, Mr. Chairman.

By virtue of my service on several other committees, I just want to share something that I think is a rising problem that I think

could be very important, and that is cyber attacks through subs of major contractors. We are seeing that in the utility field. We are seeing it also in the military. I hope it is something you can really have some urgency on. You can have a five-person engineering head hunting firm that gets into the system of their general contractor and thereby can steal intellectual property. I think it is something we are now seeing more of, and I hope you can put the fear of God into some of these people and not just rely on the big guys having good security but the subs that have access into their system. That is just a point I wanted to mention.

I am a little worried about the timing of the *Columbia*-class. Tell me about how that is coming. I understand it is getting tighter. There have been some problems and the schedule is shrinking.

Secretary GEURTS. Yes, sir. *Columbia's* schedule has not changed. As you know, we were fairly proactive in looking at critical technologies, demonstrating and prototyping those to the left of when we would traditionally do it in a program, learning some of the lessons of some of our other lead ships where we had technical challenges that drove delivery of that.

But the area that has probably gotten the most kind of visibility and has actually showed us we have work to do is on the missile tubes, large, complex welds, finding the quality, understanding how we inspect those for quality. We had some of those issues pop up last year. That has eroded some of the margin but has not impacted the schedule.

Senator KING. You are still within the——

Secretary GEURTS. Yes, sir. We still have an 11 months' margin to the need date for those. We are going to continue our prototyping activities to beat down any of the areas where we see risk in terms of construction. In terms of the program overall, they are close on their design curves and maturity. We are going to have a higher design drawing completion on that ship than any submarine we have ever produced before.

Everything we are trying to do is to maintain margin, beat out the risk as early as we can, and then position that program for success because, as you know, we do not have a lot of schedule margin on the back end of that program to get it into the Strategic Command (STRATCOM) fleet to——

Senator KING. Because there is a potential gap on the other end with the retirement of the *Ohios*.

Secretary GEURTS. Yes, sir. We are tight. There is not a gap yet, but we do not have a lot of——

Senator KING. Potential gap.

Secretary GEURTS. Yes, sir. We do not have a lot of margin on the back end. *Columbia* is our number one program. We are doing everything we know how to continue to drive risk out and deliver that on schedule.

Senator KING. Good. Thank you.

Admiral, how are we doing with the integration with the Flight III DDGs coming in? Is that going smoothly? Are we on schedule? Does it look like it is going to be a smooth transition?

Vice Admiral MERZ. Yes, sir. We are on schedule. The first one delivers in fiscal year 2023. The last hurdle really for the phased

integration of the capability we need was the final test on the radar, and that was just recently completed and the radar did fine.

Senator KING. So that is ready.

Vice Admiral MERZ. Yes, sir.

Senator KING. Maintenance plan. You talked about maintenance. I think I heard you say, at least implicitly, more aggressive work on maintenance, better scheduling, shorter periods because if we can do a better job on maintenance, we have more ships at sea. Give me a little more detail on what your plans are on maintenance.

Secretary GEURTS. Yes, sir. I would say my largest focus area over the last 6 months has been on the maintenance side. We have some issues in some of the new construction. We are not delivering yet to the degree I would want to the fleet in maintenance. My end goal is ships come in on time, ships go out on time.

Senator KING. Do you have data on sea readiness per ship? It would be nice to know. Are they ready to be at sea? Are they at 82 percent or 62 percent or 90 percent?

Secretary GEURTS. Yes, sir. We can pull all that data for you.

Senator KING. For the record, I would like to see it.

Secretary GEURTS. Yes, sir. Where I am focused on—we have talked some on the public yard side of things. I am also really focused on the private yard maintenance where we do most of our non-nuclear, in fact, all of our non-nuclear, surface maintenance and doing a couple different things there. We are really taking a hard look, putting commercial best practices on inspections the government does. We have reduced those on our availabilities by 30 percent. My target is 50 percent. So we can operate as efficiently as we can in the private yards.

[The information referred to follows:]

Secretary GEURTS. Senator, The Navy's readiness for sea plan, or force generation model, as we call it, is the Optimal Fleet Response Plan (OFRP). Under that plan ships are generally ready for sea when they are not in maintenance. But, they are not ready to deploy, prepared for high end conflict, until they have completed their training and certification. Under the OFRP ships should be in the highest levels of readiness i.e. ready for deployment, or in sustainment, slightly less than 50 percent of the time. The specific numbers of ships in these readiness categories are classified, and will be provided to the Committee under separate cover.

Senator KING. Because that equals more ships.

Secretary GEURTS. Yes, sir. We got to get them out on time because if we do not get them out on time, that just ripples all the way through the force.

The second piece is relooking at our contract strategy. We tended to award ships one at a time with not a lot of planning window, which made it really tough on industry to operate efficiently. Right now, we are moving our award dates 90 days before the availability. My goal is to get those to 180 days.

Then the third is reduce—we were doing a lot of higher headquarters contract changes versus allowing folks to fix things on the waterfront. We have already put those in so that changes under \$25,000, negotiate on the spot. That is also driving a lot of efficiency.

Senator KING. Thank you.

Thank you, Mr. Chairman.

Senator PERDUE. Senator Ernst?

Senator ERNST. Thank you, Mr. Chair.

Gentlemen, thank you so much for being here today.

Senator Hawley, thank you for bringing up AI and those capabilities because I want to dive in a little bit more there.

Earlier this month, I held a subcommittee hearing through Emerging Threats and Capabilities, and we did talk about AI. We have the development fielding of AI systems in our own formations, but we are also keeping an eye on what Russia and China is developing. At what point do you assess that artificial intelligence will be making a critical difference in the way Russia and China deploy their forces? Do you see that as an imminent action or is it further down the line?

Secretary GEURTS. Yes, ma'am. My sense is it is on a continuum. I do not think it will be, you know, today this, tomorrow that. I think the way the Department of Navy—and again, both my compatriots join in. AI can apply to large things and small things. Using artificial intelligence on maintenance, how do we do smarter maintenance, how to increase the speed we can train, as well as some of the big kind of data analytics decision-making tools. I think all of those are in varying states of maturity. Some of it is ready to go right now. We are looking to accelerate that into the force now. Some of the larger will take time to perfect. That is kind of my sense of it right now.

Senator ERNST. Would you say that we are on an even playing field with some of our adversaries and where they are with AI?

Secretary GEURTS. I would say we are ahead, but I would say that is—we have got some sockers that are catching up to us if we do not continue to focus on it. The Department of the Navy, as well as the Department overall, is really focusing on it so we do not lose our competitive advantage here.

Senator ERNST. Are there other recommendations? You mentioned maintenance, and that is always a great way to use AI through any of our branches of service. Are there things specific to our naval forces that you think would benefit by using AI?

Secretary GEURTS. Yes, ma'am. Again, I will maybe ask two folks to jump in here.

I think training is another one, how to speed up training and get really kind of personalized training. As we said, we have a large workforce on the shipyard we are trying to train. We have very complex systems we are putting in the field with a growing junior force. Understanding how to fully leverage that I think will be critical.

I would say at the higher levels how we do decision-making.

But maybe, Admiral Merz, do you want to jump in?

Vice Admiral MERZ. Yes, ma'am. I appreciate the question. This is a high interest item for the Navy. I would be happy to get with you in a classified setting on the comparative capabilities between us and at least the pacing adversaries.

But where I think this is an enabler not just for fighting but for peacetime operations, situational awareness, how we manage the force, where we place the force. We are still considered the largest, most capable navy in the world, but when you disperse us over the globe in any one particular area, we are likely not the largest, and depending on how much time we had to respond. We see this as

a critical enabler for both what we will call man in the loop, man on the loop, or just machine-to-machine discussions, and we are pursuing all that.

As a matter of fact, it is a very rich area where we are partnering with industry. We were hoping we could just adopt a solution, and we are discovering that industry is struggling with this like we are, and we have found a lot of middle ground. We can work together.

Senator ERNST. I do appreciate that. I just think there is a lot more that we can do with AI not only administrative tasks, maintenance tasks, but also as AI applies to autonomous vehicles and so forth. You know, we may not be quite there yet, but at some point, we will start to see more autonomous vehicles out there, autonomous boats perhaps. You are very personnel heavy.

Secretary GEURTS. Yes, ma'am. In this year's budget, we have over \$400 million in 2020 and over \$3 billion in the FYDP on autonomous ships. That was going to be my kind of final comeback. AI and machine learning—that combination to get the capability we want out of those autonomous ships is absolutely critical, and we are already applying to the autonomous vehicles we have, another area that is very rich.

Senator ERNST. Okay, very good.

Well, my time is about to expire. Gentlemen, thank you. Admiral, I may take you up on that offer. We can do a deep dive. Thank you.

Senator PERDUE. Senator Kaine?

Senator KAINE. Thank you, Mr. Chair.

Thanks to the witnesses. Good to be back with you. Thanks for the good work that you are all doing.

I want to talk about the *Harry S. Truman*. This is the first Seapower Subcommittee we have had since the news came out that in the President's budget request there is a suggestion that the *Truman* not be refueled at its midpoint.

The committee hears a lot both in open and classified about the continuing need for the aircraft carrier platform in terms of the capacity that it provides, but also in terms of the flexibility. It can be here; it can be there as problems crop up in different parts of the world.

The military has recently made a commitment to do a two-carrier buy. Those new carriers are important. But I think a lot of us were puzzled about a suggestion that you would squander an asset at its midpoint when it might have another 25 to 30 years of active life post refueling. This is really the first opportunity we have had to kind of ask what is the thinking behind that. I know there is an ongoing study about how to get to 355 and what the mixture is. But if you could talk about the thinking behind the recommendation, that would be helpful.

Secretary GEURTS. Yes, sir. I will start out and then ask Admiral Merz to jump in from his perspective as the warfighter.

First I would say is we are all in on the *Ford*-class carrier. That is why we signed a two carrier deal. We see that, as the Acting Secretary said yesterday, we need carriers now. We need them in the future. This is not a survivability issue or the Navy walking away from carriers by any regard.

But we are looking at how are we going to be competitive in the future and what is the force mix that gives us the most competitive advantage in the conflicts we see going forward. That necessitated some bold moves and some tradeoffs, quite frankly.

What the Department looked at is getting the *Fords*, getting that is our carrier of the future. That allows us to put the air wing in the future on and trade for that, particularly in the out-years of the FYDP, capability for some of these unmanned systems and some of these other cost-imposing systems that we think we need to complement the carrier of the future.

That was the thought process. It was a tough challenge. It was somewhat of a bold move. We want to have that discussion early enough to have the robust debate it deserves with an ability to continue to look at that and understand if it is the correct decision from everybody's perspective.

Bill, would you like to add?

Vice Admiral MERZ. Yes, sir. Thank you for the question. This is, obviously, a very big deal to us as well, a very important decision that took a lot of thought.

Our commitment to our carrier requirement is the *Ford*-class. However, that requirement evolves over time. It is still 12 carriers, and we are committed to getting to 12 carriers.

This is a warfighting investment decision. We have done a whole series of studies, including several directed by the defense committees, and they all push us in the direction of a more distributed force, autonomous vehicles, directed energy, rail guns, and all these things are investments that we decided now is the time to move out on.

We know the security environment is getting more complex. Having this more distributed, cost-imposing force we think will complement the battle force. It is not intended to replace the battle force.

The effect of removing the *Truman* will be realized in the late 2020s, 2027, 2029 when she would have come out of the yards. Over that time, we are going to continue to validate this approach. We are going to continue to experiment. We will adjust in stride. We have a long history of doing that. Yes, this is a reversible decision, but we would like not to reverse it at the expense of these other capabilities that we need to pursue, and every indication has told us we need to evolve and to pursue.

Senator KAINE. Can I ask you this? You say the gap would show in 2027 and 2029 when it would come out after the refueling. I think the refueling is supposed to start in 2024. Is that right?

Vice Admiral MERZ. It would. That would have started regardless.

Senator KAINE. Let me ask this. There is still an ongoing study. This is still sort of under some analysis. In that analysis, are you taking into account the effect on the industrial base of not doing the refueling? What we have heard from industrial base partners that work on the refuelings is that they really worry that they are in somewhat of a fragile spot, and removing that refueling beginning in 2024 could jeopardize them. Is that one of the areas that you are analyzing as you try to reach the—

Vice Admiral MERZ. Yes, sir. The analysis I am speaking of was a warfighting analysis. The analysis on the industrial base was done in advance of this decision. I will turn that over to Secretary Geurts to comment further.

Senator Kaine. If I could, Mr. Chair, just have him answer that last question, that would be great.

Secretary GEURTS. Yes, sir. As you know, anything in shipbuilding is all about the industrial base, and while there is some fungibility in terms of the skill sets needed to do this overhaul, there is a lot of specialized skill as well. We have looked fairly closely at that. I think we will probably make some adjustments in the budget looking forward should the refueling continue to be off our plan, where do we move the inactivations, and look at that closely, work closely with the shipyard. There is a gap we see that it would cost. We have a lot of inactivation work to do, but we are going to have to work that closely with the shipyard to understand because we are going to have to preserve that workforce capability. I do not want to trivialize that as an issue to work. We have some time to work as that workforce impact would not really hit until 2023 and then into 2024. It is something we are going to have to work. We looked at it at the top level as we made the decisions, but it will be something we are going to have to work closely with the shipyards on.

Senator Kaine. I appreciate it.

Thank you, Mr. Chair.

Senator PERDUE. Senator Cotton?

Senator COTTON. Thanks, gentlemen.

Let us keep probing that line of questioning from Senator Kaine. The decision about the *Truman* has been in the news a lot lately. We have been talking about it a lot here in Congress. The *Truman* is still good to go, though, until 2024. Is that right?

Secretary GEURTS. Yes, sir.

Senator COTTON. Because that was when it was scheduled to enter its mid-life maintenance cycle. When was it scheduled to come out?

Vice Admiral MERZ. 2027, 2028. It is all part of the shipyard loading and how—

Senator COTTON. The decision that is being taken now will not have a real world impact then until about 2027 or 2028.

Vice Admiral MERZ. Yes, sir. But the decision is only reversible for about another year.

Senator COTTON. What exactly is that real world impact in 2027, 2028, just in laymen's terms?

Vice Admiral MERZ. That is a little bit of a foreseeing threat vector analysis. The way we approach is what capabilities might we need to predict what we think is coming—

Senator COTTON. Just in simpler terms, on your carrier fleet, what is the practical impact in 2027 and 2028 if the *Truman* does not undergo that refueling?

Vice Admiral MERZ. It will be one reduction in a carrier through the—

Senator COTTON. For how long?

Vice Admiral MERZ. Until she would have retired in 2048.

Senator COTTON. How much money do you save by not undergoing that mid-cycle refueling?

Vice Admiral MERZ. It is about \$4 billion to not do the overhaul, and then it is a savings of about \$1 billion a year in operating cost.

Senator COTTON. You are proposing to put that money into *Ford*-class carriers.

Vice Admiral MERZ. We are proposing to put it into a whole spectrum of capabilities that will complement the force.

Senator COTTON. Could Congress resolve this challenge or this tradeoff that has been created for you simply by putting a little bit more money into the shipbuilding program over the 5-year defense plan and then into the future?

Secretary GEURTS. Yes, sir. So you will start in terms of practicalness in the next 2021, 2022. We normally order our equipment, long-lead activities for that. Then in 2023, 2024, you start the labor portion of that. As we balanced the top line, we made that decision.

Obviously, you could trade within the top line or add to the top line. The dollars in 2020 are fairly negligible. 2021 and 2022 is really—if we do not make the hard decision by not doing it, you will have made the decision because we will not have the long-lead equipment.

Senator COTTON. Got it. The simple answer, though, which the Department of Defense would usually tell Congress is we can solve some problems for you if we give you a little more money. Right?

Secretary GEURTS. Yes, sir.

Senator COTTON. Got it.

Let us talk about carriers and the role they play, specifically the vulnerability to them. We hear a lot about the asymmetric threat. It is a classic example of a really expensive boat versus a really cheap missile. We are talking primarily here about China, just to get down to brass tacks. ISIS does not have anti-ship ballistic missiles against Russia and Europe. You are looking at primarily an air and ground war. Not entirely. Primarily. So we are talking about China and its anti-ship ballistic missile fleet.

These carriers are not just sitting ducks, though, out on the water. Are they? I mean, how easy is it for China to hit one of our carriers with a ballistic missile?

Vice Admiral MERZ. This is the question that I really look forward to answering. I can give you a lot more detail in a classified setting. I think we should do that.

I will tell you this is not a survivability decision about the carriers. We feel very strongly the carrier is more survivable now than it has probably been in the last 70 years. We can walk you through why we think that both from a capability standpoint and also on how we operate the aircraft carrier.

Senator COTTON. How fast is a carrier?

Vice Admiral MERZ. It is a little bit of a sensitive number. Fast.

Senator COTTON. It is really fast. It has lots of defenses?

Vice Admiral MERZ. Yes, sir.

Senator COTTON. I knew some lieutenants in Iraq who were somewhat cavalier about incoming mortar fire on their bases. They used to say big base, little bullet. The ocean is even bigger than a base in Iraq or Afghanistan. Right? So big ocean, little bullet.

Secretary GEURTS. Yes, sir. It is the only runway that will move 700 miles a day.

Senator COTTON. Got it.

Which brings me to a final question—

Vice Admiral MERZ. I would like to clarify that is not our defense.

[Laughter.]

Senator COTTON. I understand.

Vice Admiral MERZ. That is an element of the operations.

Senator COTTON. But speed is security.

Vice Admiral MERZ. Yes, sir.

Senator COTTON. Final question. There is that threat, though, of the anti-ship ballistic missiles against not just the carriers but any surface ship. Is that one of the main advantages that we have in our undersea capabilities, our fast attack submarines, that they are not susceptible to that kind of anti-ship—

Vice Admiral MERZ. Yes, sir. Our whole approach to warfare is using cross-domain capabilities to effect whatever capability we need based on the face of the threat. The undersea capabilities for us we think is our number one asymmetrical lethality advantage over anyone else in the world.

Senator COTTON. As China's missile threat does, in fact, potentially force us a little bit further away from the first island chain, those fast attack submarines can loiter a lot closer.

Vice Admiral MERZ. The submarines will have to work a little bit harder.

Senator COTTON. That is one reason why it is so vital that we maintain the shipbuilding pace for those fast attack submarines in the medium and long term and do not let, as Secretary Shanahan said the other day, a capability or capacity gap emerge.

Vice Admiral MERZ. Exactly right, sir. We can make this argument on every shipbuilding line for what they bring to the fight.

Senator COTTON. Thank you.

Senator PERDUE. Senator Shaheen?

Senator SHAHEEN. Thank you, Mr. Chairman.

Thank you all for being here.

Secretary Geurts, I was really pleased to hear you say to Senator Hirono that you reaffirmed the commitment to the shipyard infrastructure optimization plan. As you point out, the average age of our dry docks is 60 years old. You also acknowledge that the biggest shortfall we have is with our attack submarines, and as Senator King pointed out, we all understand that the better job we do on maintenance, means that we can have more ships at sea.

I was really surprised when projects from the Portsmouth Naval Shipyard showed up on the military construction list of projects to take money from for the President's border wall. I was particularly surprised because I know you were at the Portsmouth Shipyard last fall. You were briefed on the projects which directly relate to our ability to expand the dry dock capacity there and allow us at the shipyard to be able to do maintenance on more ships.

Can you explain what the thinking is here, why we would take money from those projects that would back up our ability to address our backlog in attack submarine maintenance?

Secretary GEURTS. Yes, ma'am. The list that was generated was generated just based on those projects that met a certain set of criteria. That was not the list, as I understand it, of projects that were not to be funded. That will be a secondary process that the Secretary of Defense will work through.

I believe and what I have heard is the Secretary of the Navy will have an opportunity to provide his thinking in terms of readiness impact and all the other impacts should any of those projects be defunded.

The list itself was just a list to a certain set of criteria, particularly those that have not been funded yet in 2019, as I understand it, but that is not a list of projects that were to be defunded, as I understand it.

Senator SHAHEEN. But you would acknowledge that there is some uncertainty about that. I can tell you, having visited the shipyard last Friday, that there is a great deal of uncertainty at the shipyard among the people who work there about what this means for their future. I would argue that if we want to send a clear message about the importance of our attack submarines and our Navy and what is really critical to our national security, that we would not put those projects that are critical to maintaining our attack submarine fleet on that list of projects to be considered for defunding.

Can you tell me what the Navy's response was when you were asked to list projects?

Secretary GEURTS. Yes, ma'am. Again, that list was created to a certain set of criteria, not the value or importance of each one of those projects. Instead of have they been obligated yet, it was not a value judgment of the project. It was just a generic formula to a set of criteria the Secretary of Defense had put together.

I will affirm the absolute criticality of maintaining our optimization plan. The Navy intends to put \$21 billion towards that over the next 20 years. A lot of these near-term projects are absolutely critical, particularly in Portsmouth with dry docks which are some of our oldest dry docks in the Navy that we need to maintain those capabilities. I would be hopeful that folks in the shipyard do not take that as a signal of the lack of our commitment or lack of importance to that modernization.

Senator SHAHEEN. Well, I think it sends a very mixed message that is not a good message for the Navy, for the people who are so committed to ensuring that we have the ships that we need in the fleet, and for the country about what is important if we are going to maintain our national security.

I would like to pick up on the question about our industrial base partners next because one of the things that I have heard is that there is a lack of *Virginia*-class parts available in the national stock system and that the public shipyards are taking extraordinary measures to get parts and that is often resulting in delays.

Can you comment on that and what is the problem there and what we need to do to address it?

Secretary GEURTS. Yes, ma'am. As we have gone to two *Virginia* ship per year rate, as well as had more *Virginia* submarines in the fleet, we have had some parts that failed at different rates than we expected when we put the original supply system in there. Congress has been very helpful to fund in our kind of integrated enter-

prise plan particularly parts that are common across our submarines and carriers to allow us to invest in those suppliers to get those suppliers up at rate. That is not only critical for today's operation, but as then we add *Columbia* on top of it, we have got to make sure the supply base is really ready to operate, not only to produce more but to sustain more that we have in the fleet. We are continuing to work on that very closely. I appreciate the great support.

Senator SHAHEEN. Is that what it is going to take to make sure that we have the additional parts? Is it to make sure there is more funding or what?

Secretary GEURTS. No, ma'am. I mean, it is continued focus on it, continued looking at it.

The other thing we are working closely with our supply base is allowing them to see the composite need between current construction, future construction, repair and maintenance. That way they can size and they can understand the demand we will be placing on them and make smart investments so that they are going to be ready as we continue to place more demand.

This is a little bit of the—when we talk about supply base, when we did not build submarines for about 10 years, this shows in perfect clarity how long it takes to rebuild that base, how fragile it is, and how important that the whole Nation continues to focus on it because if you take your eyes off it or go on a bust cycle, it is really, really hard to get that back particularly when you want to add new capability.

Senator SHAHEEN. Thank you.

Thank you, Mr. Chairman.

Senator PERDUE. Senator Blumenthal?

Senator BLUMENTHAL. Thank you, Mr. Chairman.

I want to, first of all, Secretary Geurts, ask about the submarine program. You are convinced that the three-ship program *Virginia* attack class is a prudent and actually cost or money-saving way to plan going forward for this year so that we can continue at two ships per year and have that option of a third and, in the end, will help to save resources.

Secretary GEURTS. Yes, sir, particularly as we look at that gap coming up. Since we are going to fund it all in 1 year as opposed to—we did not include it in our kind of economic order quantity. It will not deliver as if it was a 20-ship. A lot of details to work through to make sure we have got it feathered in on the line, but I believe we would not have put it in the budget if I did not believe we could not execute it.

Senator BLUMENTHAL. Let me ask you whether you think that the training and manpower education programs are commensurate with the demands we are going to have at that yard and others that will be involved. Obviously, thousands of new workers are going to have to be hired. I visited the apprenticeship and the training programs at Electric Boat and elsewhere in southeastern Connecticut, and my own view is we are going to have to be making a much greater investment in those training and education programs.

Secretary GEURTS. Yes, sir. I would say both the submarine yards have been putting a lot of energy into that. It is a critical

factor in terms of how well we can actually execute the programs we have had. As we have seen on some of the *Virginias*, as we have tried to accelerate them, we have done a great job getting that 66-month centers as we have tried to move to 60-month centers. We have seen some challenges on having a sufficient trained workforce. I think the programs are in place.

What I would say is we are going to have to solve this before *Columbia*, and so to the degree this continues to help put us on a smooth growth path to the large number of the workforce we are going to have to bring in for *Columbia*, that will benefit us.

Senator BLUMENTHAL. The funding for many of these programs—for example, Electric Boat is going to go from 20 in its design apprenticeship program up to, I think, more than 300—come from the Department of Labor, not from the Department of Defense. The Department of Labor's budget in the President's budget will be cut, I believe, by around 30 percent for training and education programs of exactly the type that are necessary for this purpose.

Are you concerned?

Secretary GEURTS. Absolutely, sir. I would be happy to follow up with you on some more detail. We have had contact with the Department of Labor, and I would be happy to go over there personally. I know the Secretary of the Navy has also had interest in this to ensure they understand the criticality and the priority of that to support the Navy.

Senator BLUMENTHAL. Well, you and I are totally in agreement on the criticality of that funding, but if the President's budget is adopted, it simply will not be there in the Department of Labor. I hope that we can move forward together and kind of change that budget. It is not in the jurisdiction of this committee, but I think it is important to our national defense. Would you agree?

Secretary GEURTS. Absolutely, sir.

Senator BLUMENTHAL. Thank you.

Maybe I can ask you whether in your view there is likely to be a loss of faith among the general public when they see a carrier like the *Truman*, which has another 30 years of life—forgive me—scrapped to put resources into other programs that may be worthwhile, and yet we are building more carriers. I have trouble explaining that to folks in Connecticut who say, you know, we drive our cars until we cannot use them anymore. Right? At least some of us do. We do not just trade them in necessarily because we like the looks of another car, another ship, particularly when we are spending billions of dollars. What would you say to those folks?

Secretary GEURTS. Yes, sir. The new carrier does provide additional survivability, additional capability, additional flexibility for the 50 years going.

Senator BLUMENTHAL. The *Truman* is not survivable. Is that the message?

Secretary GEURTS. No, sir. All I would say is that the existing *Nimitz*-class are absolutely awesome carriers that are doing a great job. What I would say, though, is we are committed to the *Ford*-class carrier in overtime replacing the fleet with that newer class carrier. That is true. We made a hard decision in terms of trading off additional 25 years and the sunk costs that go with that to some of the other capabilities. It was not a trade of a *Ford* versus

the *Truman*. It was in the broader perspective of we need carriers, we need them for the future. They are in every scheme we have. We also need some other capabilities, and given the budget limits we had, we had to make some hard tradeoffs. I would not say the *Trumans* have no value and we do not assess any value to the *Truman*.

Senator BLUMENTHAL. I would like to follow up because my time has expired, and I apologize, but just in terms of our conveying the explanation to our constituents in terms they can understand, I think it would be important to be armed with those facts and arguments.

I want to conclude by congratulating Lieutenant General Berger on your nomination to be Commandant. This may be the last hearing that you go without getting tough questions, sir.

[Laughter.]

Senator BLUMENTHAL. But we look forward to working with you and congratulations.

Thank you.

Senator PERDUE. We will now enter a second round if you guys have other questions. I have one I would like to probe.

Mr. Secretary, Director of Operational Test and Evaluation's fiscal year 2018 annual report talked about significant rents of the *Ford*-class. There were four systems that are the most problematic right now. Right? The electromagnetic launching system, the advanced arresting gear, dual radar, and then the advanced weapons elevators.

These technical issues have caused delays, obviously. Also they talked about the demonstrated reliability. The question was also brought up in the annual report about the catapults' resting gear, the elevators, and radar.

Would you give us an update on those four systems and also talk about the maintenance period that we are in right now? I think there was an 8-month delay. Now it looks like a 15-month delay. Can you talk about those two very important issues relative to the *Ford*-class?

Secretary GEURTS. Yes, sure, absolutely, both very important issues.

Those are kind of the four new technologies we put into the *Ford*-class, newest carrier design we have done—we had not done a new carrier in 40 years.

I would say on the first three, on the electromagnetic launch, the resting gear, and the radar, I think we are in good shape there. There is going to be reliability we are going to have to test, and we will not be able to do that until we go to sea. We have done 750 traps and launches with the system. But I would say we have to get it in sea and put it through its paces. I am fairly confident there.

Elevators. We have 11 of them. Two of them have been delivered. They have been operating. Cruise force has full control of those. They have been operating reliably. The feedback I have gotten from the crew has been very positive. We have nine more we have got to work our way through, two uppers and seven lowers. We are working our way through that particular area. I have not seen anything in the elevators that shows me that it is something we can-

not solve, but it is a lot of work to work our way through those pieces.

Senator PERDUE. Sorry to interrupt. The boat was supposed to be delivered in 2015. As I understand it, it was delivered in 2017. This is now 4 years in and the elevators are still an issue. Is this a learning experience for us as we go forward in terms of new technologies and application on these lead ship developments?

Secretary GEURTS. Yes, absolutely. I am happy to kind of talk. Lessons learned we are putting into kind of all our new lead ship designs. But certainly I would say—and again, I was not there at the time, so I have the benefit of looking backward. We did not build the ground test infrastructure for these new technologies to prove them on the ground before—proving it the first time for the elevators on the ship has not been the right path to go forward, something we do not want to repeat on other ships.

The other thing I would say is I am commissioning—I talked I think in November about it. I am going to commission an independent review team for the technologies, not as much for the lead ship, but making sure that we have all the support, all of the technical support, spares, everything we need to do as these systems go to sea to ensure we have got all the infrastructure in place to support the ship and the crew long term. Some immediate issues to get everything working on 78 now just left to the elevators, a couple of remaining elevators. But I want to make sure we have got all of the back-end support in place so when that ship goes to war, the captain can take her out with complete confidence and understand that everything will work and we have got all the proven reliability and support needed.

In terms of getting out of the availability right now, we have got three causal factors causing the delay getting out of the yard. I never want to deliver something late to the fleet. I view that as a failure on my part of getting that ship out on the schedule we had. We intended in July. Right now, my best estimate is October.

That is driven by three causal factors. One is repairs and changes made to the nuclear propulsion plant based on lessons we learned out of sea trials. The second piece is just the balance of all the things we had intended to do and the availability, just the kind of scope of work. Then the third is finishing up those remaining elevators and getting those to the point where the crews got access and can use all of them.

Senator PERDUE. Yes, sir. Thank you.

Senator HIRONO?

Senator HIRONO. Thank you.

Just as a follow-up to the request for three *Virginia*-class boats, so Secretary Geurts, how concerned are you about delays in the current submarine construction program where we are only building two attack boats per year and construction on the *Columbia*-class strategic missile submarine program has barely started? What does this performance say about the ability to ramp up production for an extra attack boat, the third boat in fiscal year 2020, or the advisability of ramping up production in fiscal year 2020 with no plan for building three boats per year during any other year in the 30-year shipbuilding plan?

Secretary GEURTS. Yes, ma'am. I would say strategically one of the things we tried to do on the 30-year shipbuilding plan and one, I think, of the real benefits of this year's plan versus last is you saw a smooth-out of that production in growth profile. Maybe in a follow-on discussion, Admiral Merz can talk about the benefits. That is I would say generically because the better we can smooth that out, the better it helps training and manpower and all the other pieces.

On *Virginia* specifically, as I said, we started with an 84-month span. We have gotten those ships down to 66 months. Our goal was to try and drive them all the way to 60 months span time at two per year. We are struggling a little bit to get all the way down to 60 months. Adding the third one in, we are going to have to work that. It is a little bit challenging from a perspective of it will look different because we do not have the advance procurement. We have done it all in 1 year. But we have also got a block buy 5-year program to kind of feather that ship in.

I worry very much about ensuring, as we grow that submarine enterprise, we can do it smartly, repeatably, and sustainably. We were already going to be somewhat challenged going from two submarines in *Virginia* to add *Columbia*. This will be a good opportunity to continue to pressurize that system and work out where do we have weak spots and friction points as we get ready for *Columbia* to size that workforce and capability there. I think to some degree, there will be some benefit to moving in there, but it is something we are going to have to watch very closely.

Senator HIRONO. You are going to need to watch that very closely because I recognize that our submarines provide us with the asymmetric advantage in warfare. Because you are being very aggressive in terms of the production of our submarines, we are going to need to make sure that you are totally on top of that.

Now, going back to the refueling of—

Vice Admiral MERZ. Senator, if I could just pile on to complete the answer here.

Senator HIRONO. Please.

Vice Admiral MERZ. It is well documented, the value we put in the submarine force and the gap between the requirement and where we are today. It is also a great example of what happens when you walk away from a shipbuilding line for a decade like we did in the 1990s and you get to the point where there is only so much you can do to recover. All of that drove to get that third submarine into the 2020s.

To your specific comment, the next multiyear plan does include options for a third submarine for fiscal year 2022 and 2023. Time will tell.

Senator HIRONO. We will be getting that assessment.

Vice Admiral MERZ. Yes, ma'am. That was stated in the shipbuilding plan, and that was actually directed by the defense committees to include that in the next negotiation.

Senator HIRONO. Turning to the refueling of the *Truman*, so our aircraft carriers are very much a big part of our forward presence, and that is really important and particularly with China and North Korea. You explained that this was a hard tradeoff because of budget considerations. As Senator Cotton said, if we were to give

you more money, you would keep the *Truman* in place. Would you not?

Vice Admiral MERZ. Yes, ma'am.

Senator HIRONO. Would that be your druthers?

Vice Admiral MERZ. Our druthers would to not surrender a carrier that has 50 percent of its life remaining.

Senator HIRONO. Yes.

Vice Admiral MERZ. But we would like to not do that at the expense of moving out on these other technologies, what every assessment has told us—

Senator HIRONO. Yes. But basically we should consider giving you more money. Right?

Vice Admiral MERZ. Yes, ma'am.

Senator HIRONO. That you can not only save the *Truman* but you can do these other opportunities, as you say, Mr. Secretary, to invest in advanced and distributed systems that will shape future naval warfare to expand our competitive advantage.

Secretary Geurts, you said that with regard to, again, the refueling of the *Truman*, I know that there are a lot—it probably affects thousands of workers when we do not refuel the *Truman*. You mentioned that you need to preserve the workforce. For a number of reasons, everything, yes, does become a budget kind of a consideration.

But it is hard to explain to people why you would basically have thousands of people who would otherwise be working on the refueling, not to mention we are not getting the full life of this boat. Kind of hard to explain why we are not doing it if there are other ways that we can provide funding for that to occur.

Secretary GEURTS. Yes, ma'am. It will not be as large a job if we inactivate that ship. We will carry some of the workforce between this refueling and the next one down the pike. But we are going to have to watch very closely the skill sets in that refueling and work closely with the shipyard to balance all of that out because we do not want to lose that critical skill set.

Senator HIRONO. Not to mention that the shipyards that were intending to do this work—it is not as though they do not have some fixed costs regardless of whether they do the work or not, and those fixed costs have to be borne by the taxpayers eventually.

Thank you.

Senator PERDUE. Senator King?

Senator KING. Thank you.

All this talk about submarines—I mean, about aircraft carriers. I was fortunate enough to spend a couple of days on the *George Washington* at sea, and the captain greeted me and said you are going to be staying in the admiral's quarters. I was feeling pretty cool because I was staying in the admiral's quarters until I found out it is right under the catapult.

[Laughter.]

Senator KING. They were doing night landings. So maybe the electromagnetic catapult will be a little less noisy. I do not know.

A couple things. Admiral, we are talking about a future large surface combatant to be the next generation after the DDG-51 [guided missile destroyer]. Both of you, if you will tell where that

project stands, what you think of it, and what you are thinking of in terms of timing.

Secretary GEURTS. Yes, sir. Maybe I will start with kind of the timing piece and then Admiral Merz can kind of talk capability, where we are thinking at.

Right now, the first one will be in 2025. The immediate—

Senator KING. Are you saying delivery in 2025?

Secretary GEURTS. No, sir.

Senator KING. Initiation.

Secretary GEURTS. Initiate. So right now, it is outside the FYDP, first year outside the FYDP.

Money in the budget to start doing the development, prototyping—so as we understand, work closely with Admiral Merz on the requirement and with industry on what the state of technology is, our intent is looking at prototyping, looking for those high-risk areas where we need to prototype some of that technology so that we do not have some of the repeat lessons of some of our previous lead ships where we kind of went right into lead ship. That will be an activity we are going to mature over the year. Similar to what we have done on frigate, we will have a very active conversation with both industry and our technical warrant holders, understanding the balance of risk—

Senator KING. We are at the very beginning of that process.

Secretary GEURTS. We are at the very beginning of that.

Senator KING. We are finalizing requirements and—

Secretary GEURTS. Yes, sir.

Senator KING. Admiral?

Vice Admiral MERZ. Yes, sir. We learned a lot from the frigate program, bringing in industry early, discussing the art of possible ahead of the requirements generation, where in the past we probably got in a bad habit—

Senator KING. Looking at existing designs too.

Vice Admiral MERZ. Looking at existing designs. Existing designs are going to be part of the large surface combatant review as well. As a matter of fact, the aperture is wider on the larger ship than what we started off with the frigate.

We are very happy with how the frigate is progressing. The lethality of the ship is going to be higher than we initially thought we were going to be capable of getting. I think that will affect probably the ultimate numbers of large surface combatants we need. That will all be part of the force structure assessment as we are coming through that.

With the lessons learned from the MQ-25 unmanned tanker, the frigate effort, we are going to work with industry this year to see if the art of possible also includes accelerating that ship potentially to fiscal year 2023 or fiscal year 2024.

We are motivated to get our surface ship mix correct per our future surface combatant analysis studies. That included the frigate. That includes the large surface combatant, and that includes this whole family of unmanned systems that Secretary Geurts commented on with a massive investment this year in the President's budget.

Senator KING. General, you have been the forgotten man this morning. What about sealift? I am worried that we are focusing all

on the combatants, the submarines. Are we at where we need to be in terms of planning for additional sealift capacity? We got to get your marines ashore.

Lieutenant General BERGER. I will ask my teammate to jump in.

On the sealift, probably two parts of it. One, the strategic sealift from Continental U.S. (CONUS) across and the other one, the more operational to tactical level sealift that deploys and then postures the force as needed, all of which is aging and all of which the Navy and the Marine Corps are working hard to resolve. There are three different approaches, which I will ask my teammates to talk about.

But in the end, we have to be able to move the forces we need to. We know that figure and it is pretty steady, the size of the force. But the speed at which we need to move them and the reliability of those ships is what we got to attack.

Secretary GEURTS. Yes, sir. I think just from the current force requirement, it is pretty constant for heavy lift. We just need to go recapitalize that. We have got kind of three lines of attack, you know, buy some—

Senator KING. We are on a schedule where we do not have a gap in capacity.

Secretary GEURTS. We are on a schedule where we do not have a gap in capacity. But those are aging pretty quickly. We are really looking hard at that current kind of heavy lift fleet. We were going to do some service life extensions. We will continue to do a business case to see if that makes sense and then come back to the committee if there are opportunities to accelerate that, maybe buy some more used ships as opposed to keeping the old ones around. We are working our way through that.

Bill has done a lot of work on, I will say, the new sets of requirements and it is probably worth a minute, if you would like, on where we are thinking there.

Senator KING. Sure.

Vice Admiral MERZ. Yes, sir. The requirement work we have done in what we call the off season here is reflective of how we shifted our whole fleet employment model of distributed maritime operations, which really is a return to what it looks like to face a potential peer. Part of that is the logistics support, the strategic lift coming over, we will get it into a safe area so then now what? What do you do with it to distribute it and you distribute it into a contested environment. That is an evolving requirement. It is reflected in some of the work we are trying to do on the existing ship lines and our unfunded priority list as we look at logistics, we look at repair, we look at hospital ships. We know that the two hospital ships are not enough to support us in a distributed maritime operating environment.

All this, we are expecting a requirement to continue to grow. We know the capabilities we need. The capacity is still under review. That also will be fed into the force structure assessment. Lighter, faster ships that can serve those specific purposes, but also carry a lot of gear for the Marine Corps quickly and efficiently.

Senator KING. I just want to be sure when we are talking about all these exciting attack ships, we do not forget that sort of work-horse piece.

Secretary GEURTS. It is on our radar, sir.

Senator KING. Could I ask one more question, Mr. Chairman?

Senator PERDUE. Absolutely.

Senator KING. Yesterday we had the Army budget hearing, posture hearing. There is a term that I have been learning in the last few days called "OCO for base." Does your budget include OCO for base?

Secretary GEURTS. Yes, sir.

Senator KING. What percentage is it? Do you have any idea? In the Army, it was 34 percent of their budget was OCO. Half of that was OCO for base and half of it was traditional OCO. You can take that for the record. I would appreciate it if you would. It is a concern to me, Mr. Chairman, because it is really not honest budgeting, and we are going to be discussing that.

Thank you. I appreciate it, gentlemen.

[The information referred to follows:]

To comply with the base budget defense caps of the Budget Control Act of 2011, the Department of the Navy's OCO budget of \$44.7 billion includes \$35.5 billion of OCO funding for base budget requirements in support of the National Defense Strategy. OCO-for-base accounts for 79 percent of the total OCO budget, and 17 percent of the total Department of the Navy budget (\$205.6 billion) for fiscal year 2020.

Secretary GEURTS. Yes, sir. I will get you the exact number, but it is on the order of—our OCO request last year was about \$5 billion. Our OCO request this year is about \$35 billion. That shows you the difference in terms of OCO and OCO base. But I will make sure you have the exact number.

Senator KING. For the Army, it was \$62 billion.

Secretary GEURTS. It is actually \$27.7 billion.

Senator KING. Thank you.

Senator PERDUE. Secretary, I want to talk about the lessons learned, and I want to look at a little history here. These examples were not on your watch or the leadership of the Marines or the Navy currently. But I want to see what you are doing now to address the lessons, hopefully presumably, learned by these.

But if you look at the last lead combatant ships that have been delivered, a total of \$8 billion more in the initial budget was required to construct these ships, and they had a cost growth of on average of about 10 percent, but included three lead ships that exceeded their initial budget by 80 percent or more. Three lead ships, 80 percent or more. Each lead ship that was delivered to the fleet was at least 6 months late with five of these lead ships being more than 2 years late. We already talked about the four being \$2.5 billion over budget, 20 months late, and still not operational today.

I wanted to come back to your response to that to probe a little bit. Can you be more specific about what we are doing now in this budget that we are looking at going forward that builds on the learning that you have from, say, those last eight lead ship, combatant ship deliveries?

Secretary GEURTS. Yes, sir. I was not there for all of it, so I will not pretend to second guess decision-making back then.

Senator PERDUE. That is fair.

Secretary GEURTS. I will just give you my perspective kind of here. To your point, at the second kick of the mule, you do not learn a lot. We are trying not to relearn old lessons without attacking it.

I would say a challenge in shipbuilding is your lead ship is your development ship. That provides a little bit different nuance than in an airplane program or some of the other things. It is not better or worse. It is just the fact we go at it. You tend to get a lot of learning in that first ship because no matter what you do prototyping-wise, you still have to get it in the platform, get it into operations. There are some unique elements to it.

Having said all that, we have not produced the ships in the lead ship realm the way we wanted to and got them out to the fleet at the speed and with all the capability we wanted to.

I would say there are four basic things we are doing to get after it. The first is my teammate here in terms of requirements, much better integrating acquisition and requirements, and so it is not a transactional exchange. It is an integrated exchange. You have seen us employ that on frigate where we have had, you know, with industry's involvement, a much better informed requirements setting activity because, after all, if we do not have the requirement right, we will chase that through the whole ship.

The second piece is really improved sub-system prototyping like we have done on *Columbia*, try and get everything prototyped as soon as we can, learn some lessons on *Ford* by not having land-based prototypes for all the sub-systems. We are chasing that right now a little bit. That would be the second area.

Third, I would say is ensure we have the talent. All of the services lost some organic talent when we went through this massive downsizing in the 1990s. At Naval Sea Systems Command (NAVSEA), we went from 700-ish naval engineers down to 200. We are now back to 600 there. Regaining the government talent and making sure that talent has got the skill for the work going. I look across the entire naval enterprise in terms of talent. We do not have the talent completely matched to the new needs. We are working our way through that process.

Then the last I would say is I have got an independent team right now reviewing the entire naval research enterprise to make sure we are investing in technologies, to make sure we have the right talent so that we are feeding into the process the right technologies with the right experience so that we can make smart decisions. When my teammate asks for a capability, what are the technologies that would best fit that capability.

Those I would say are the four things we are doing now to address that very important question you asked.

Senator PERDUE. Well, that is very helpful because it seems to me from the outside looking at this with a fresh set of eyes that innovation and quality and quantity are needed right now in dealing with these peer adversaries out there.

General Hyten chilled us a couple of weeks ago when he talked about we have lost our ability to go fast. I do not totally accept that, but we have got to win at this success factor I think. It is a combination of great innovation but timeliness in delivery too.

Secretary GEURTS. Yes, sir. The other thing I would say is we are really differentiating the work, and so the time to get a lead ship that we are going to keep for 50 years is different than the time that I want to get an AI algorithm into that ship or a new sensor into that ship.

I would say on the flip side what we have been able to do in the submarine force—the other day we did a launch from a digital twin of an Aegis combat system, which we virtualized. That is really helping us speed new capability onto the ships more quickly.

There is a lead ship set of issues that we have to deal with, and then there is a speed to get new technology capability, invention, whatever. We want to have a deliberate and predictable and high confidence lead ship approach, and then we want to have a high speed, high iteration turn time approach for new capabilities where we can get them in the fleet, get them in the hands of warfighters, let these guys experiment with them, and then we can figure out which we want to keep.

Senator PERDUE. That is fair. Thank you.

Senator HIRONO?

Senator HIRONO. I just have a few more questions.

Mr. Secretary, you and I talked about a recent article that was quite critical of the Navy accepting ships before they are ready with all kinds of problems. Some of those discussions that you have been having with the Chairman goes to the kind of oversight of changes, including hiring people, you know, engineers who can help you assess the kind of ships that we are accepting, all of that. That is reassuring. You need to stay on course on that.

Admiral Merz, you are working on updating the force structure assessment before the end of this year. How will you be incorporating the shift to Asia and the Pacific as you consider expanding the fleet to deploy the number of ships you need?

Vice Admiral MERZ. Yes, ma'am. The force structure assessment actually starts with the warfighting requirement, and the National Defense Strategy has set that warfighting requirement as the Asia-Pacific as the pacing threat. First and foremost, that drives the assessment. You cannot ignore the other areas, but it helps to have a driving one. For instance, we are very much closely tracking Russia technology developments. They all feed into it, but the pacing threat is the Asia-Pacific threat.

Senator HIRONO. Yes. We need to make sure that we have the appropriate resources in that area of responsibility (AOR).

Again, with the cancellation of the *Harry Truman*, what are the implications for what the new force structure assessment will include in terms of aircraft carrier force levels in the Asia-Pacific area?

Vice Admiral MERZ. The force structure assessment does not start with any preconceived force level. It will do a model. Typically the model is unconstrained up front. It usually comes up with a very large number for all ship classes. Then we apply operating guidance on where we might take risk, deployment models, and we work the number down to where we think it is about the right level. From there, it comes up with a number for each ship class, and when you add all those up, the current one adds up to 355. Where the other one goes—I do not expect it to be a smaller number, but what each one of those ship lines contributes to that will likely change to some degree.

Senator HIRONO. Are those decisions ultimately to be disclosed in a classified setting?

Vice Admiral MERZ. The analysis is a classified discussion on how we got there, but once we end up, similar to the 355 and the components that make that up, that will be an unclassified number.

Senator HIRONO. Mr. Secretary, your prepared testimony on page 5 indicates that operations in a contested environment means that the Navy's logistics fleet will need to include smaller, faster multi-mission transports. Correct?

Secretary GEURTS. Yes, ma'am.

Senator HIRONO. I do not see any specifics on a program to shift in this direction in the Navy budget, but could you give us a sense of what the Navy is doing or plans to do to shift to smaller multi-mission transports?

General Berger, how will this contested environment affect the Marine Corps' ability to conduct amphibious assault operations?

Secretary GEURTS. Yes, ma'am. As Admiral Merz described, he is working through the requirements element of that fast logistics in the contested environment right now. As that comes out, then we will work with him on acquisition solutions to go there. I think in the good news category, that will be a lot of smaller, faster roads where I think we have got plenty of industrial capacity that we can leverage. We have had great success over the last year with a lot of small businesses delivering ships to the Navy. I have not seen all the requirements output yet, but I think there is a rich industrial base and opportunity to bring in additional capabilities through those shipyards to solve that requirement. We will look at that in the 2021 budget. That is probably where you will start to see that show up.

Senator HIRONO. All right.

General Berger?

Lieutenant General BERGER. The way that we did logistics 40 years ago of offloading everything that is on the ship and build a giant pile on the beach that you could fight inland from are gone. That is never going to be able to survive.

Hence, like the Secretary pointed out, the concepts that we are working on now are driving us towards the ability to be much more dispersed, much more distributed, and therefore the logistics be much more distributed. We cannot have an iron mountain on a beach, and no one is planning on that. But the ability to move troops, equipment, and supplies laterally through an archipelagic region is driving us in the direction that Secretary Geurts mentioned, not great big haulers that dump it all on the beach, but much more smaller, more of them, faster, lower signature, all that. Yes, ma'am.

Senator HIRONO. That would, Mr. Secretary, help our industrial base at least for the smaller companies.

One last question, Mr. Chairman, if I can.

Mr. Secretary, we are aware that there have been some problems with production of the ship-to-shore connector, or SSC, program. This is a program that will replace our landing craft air cushion, or LCAC, that transport equipment and supplies ashore. I see that you have not chosen to request any production for the SSC program in fiscal year 2020. Will this gap in funding harm the program or cause a break in the production?

Secretary GEURTS. Yes, ma'am. I will describe that, and if General Berger wants to, from a warfighting perspective, give his thoughts on it.

But the zero in this year's budget should in no way signal the lack of importance of that program or lack of commitment to it. What it shows is some of the technical challenges we have had delivering that first capability and a little bit of the production backlog we have had over the last couple years. From my perspective, there is plenty of production awaiting completion of that trial. That is queuing up. That will allow us to continue to sustain that activity.

As we get the boat through its final acceptance trials, we get the initial ones produced, I think that is another one of excellent candidates where we should look at block buying or multi-yearing as we will want to get them into the fleet as fast as we can as soon as they are ready.

Our biggest hurdle right now is completing a couple of technical issues to get that boat ready to go. All testing thus far has shown the design overall is sound. We have got a couple of technical issues to work through. As soon as that is done, we will continue to accelerate that production line.

Senator HIRONO. General Berger, did you want to add something?

Lieutenant General BERGER. Last week, ma'am, I had the chance to go down to Huntington Ingalls and also to Textron. I think everybody on this side of the table would echo your concerns. We have 72 non-displacement LCACs right now. Most of them have undergone a service life extension already, and some of them may need to go through a post-SLEP [service life extension program] extension program. They were fine when they came out in the early 1980s. They could haul 60 tons and go pretty fast and cover a lot of beaches. The ship-to-shore connector at 74 times faster, more reliable is what we must have. The risks you point out, ma'am—we are going to keep the older ones longer, pour more money into them to maintain them, and they will not be as capable as the ship-to-shore connector.

Textron knows what they need. They know the technical challenge that they are facing. They have the right workforce and the right leadership in place.

Senator HIRONO. Thank you.

Thank you, Mr. Chairman.

Senator PERDUE. Senator Wicker?

Senator WICKER. Well, I am delighted to follow up on some questions that Senator Hirono asked.

Let me make sure I understand, Admiral Merz. There will be a new force structure assessment taking into consideration the warfighting requirement as guided by the National Defense Strategy. But you do not expect a smaller number than 355 ships. That was your testimony.

Vice Admiral MERZ. No, sir, I do not expect a smaller number.

Senator WICKER. It would be hard to imagine considering the threat that we have. It would be hard to imagine that your statement would be incorrect there.

Now, Lieutenant General Berger, these smaller ships going through the archipelagos that you talked about—what would be examples of those?

Lieutenant General BERGER. Right now, we have LCACs and LCUs [landing craft utility] that move our equipment and our supplies from ship to shore. What I am suggesting, Senator, is we are going to need not quite planes, trains, and automobiles but a family of connectors that can, on the surface, move our supplies, move our equipment around at greater speed between islands or between the ship to shore, between shore to shore.

Senator WICKER. Thank you for clearing that up.

Now, Mr. Chairman and Madam Ranking Member, we have a budget proposal from the administration, and administration budgets come and go. But we have got the responsibility of actually providing the authorization and the funding here, and we take that very seriously.

With regard to amphibious ship procurement, I see that the budget defers an LPD procurement, an LHA procurement till 2024. We will see about that.

But let me just ask about the need at the Marine Corps. General Berger, do we still need 38 amphibious ships indicated in the Navy's current force structure assessment?

Lieutenant General BERGER. That requirement is valid today, sir. But as mentioned earlier, the 2019 force structure assessment—we will see what comes out of that.

Senator WICKER. Okay, but that is still valid, 38.

How many amphibious ships do we have today?

Lieutenant General BERGER. Thirty-two, Senator.

Senator WICKER. Thirty-two as compared to a requirement of 38.

Do you foresee the Marine Corps mission eliminating amphibious operations at any point in the near future?

Lieutenant General BERGER. No, sir, I do not.

Senator WICKER. That is very helpful.

Let me ask you then, Mr. Secretary. Congress appropriated \$350 million in fiscal year 2019 to begin procurement of an LHA and an LPD. However, amphibious ship procurement was removed from the fiscal year 2020 budget proposal, as you know. Instead, the Navy has deferred LPD procurement to 2021 and LHA to 2024. This move has the potential to disrupt the amphibious war ship industrial base as there is a long lead time requirement for parts and materials, as we all know.

Instead of deferring procurement to 2021 and 2024, could the Navy apply incremental funding to the LPD and LHA in fiscal year 2020? Is incremental funding more advantageous than deferring procurement? If Congress approves incremental funding in the fiscal year 2020 NDAA for the LHA and LPD, would it allow the Navy to accelerate how it spends the \$350 million that was appropriated in fiscal year 2019?

Secretary GEURTS. Yes, sir. You would have to give us that authority. We have used that authority previously on LHAs, occasionally on LPDs. With that authority then and the funding we have in the budget, we could begin moving out on that long lead material.

I would say for the LHA in particular, I think we are concerned with it in 2024. It was there from an affordability standpoint. We are going to look hard in the 2021 budget at potentially moving that to the left as funding allows because I am also concerned with a 7-year break in that ship, and I do not want to lose the excellent workforce we have cranking out LHAs right now. It is in the budget right now in 2024. That is something we are all motivated to do both from a workforce standpoint, as well as its contention with *Columbia* as it starts ramping up in 2024. Incremental authority on both those ships would allow us to get at that faster.

Senator WICKER. Well, Mr. Chairman, I hope we can help them get these done in a more timely fashion.

Admiral Merz, DOD currently has an organic capacity of 15 million square feet on 65 roll-on/roll-off ships in the Ready Reserve Force with an additional 4.5 million square feet of roll-on/roll-off capacity on U.S.-flagged commercial ships through the Voluntary Intermodal Sealift Agreement. These ships are vital to wartime logistics, historically accounting for 90 percent of wartime transportation requirements. DOD has developed a recapitalization strategy for RRF vessels to maintain capacity at an acceptable level of risk.

Would you comment about that and briefly describe for the committee what the Ready Reserve recapitalization plan looks like and what measures the Navy will take to ensure that the Ready Reserve vessels and their life is extended in a reliable fashion?

Vice Admiral MERZ. Yes, sir. I will make a couple requirements—perspective remarks and turn it over to Secretary Geurts on the acquisition side.

We revalidated the 15 million square foot requirement for the strategic part of the lift. The challenge there is recapitalizing it. It is in the fleet now, but it is old. It is getting older. We are looking at creative and aggressive ways to recapitalize that fleet. There are three levers we are attempting to pull.

Building new would be preferred for the long-term health of the fleet. There are some commercial shipbuilding challenges with that that we are hoping to partner with Congress to help resolve.

There is buying used either domestic-built or foreign-built used ships.

Then there is also the service life extensions of old ships to make them even older.

So you throw all that into a pile. We are trying to come up with the right balance to get after this. Then we have the previously discussed RORO requirement of the tactical side of the logistics train. It has captured a lot of our attention, as we have shifted to this distributed maritime operation and have a distributed logistics operation to go behind it. I think we are postured well to start moving out.

I will turn it over to Secretary Geurts.

Secretary GEURTS. Yes, Senator Wicker. I think again both those three lines of operation are there. As we look at the commercial market and what is available on the commercial market for some of the fairly generic RORO ships, we think there is good opportunity to continue to look hard at that and perhaps relook at the business case and purchase some rapidly off the commercial market, accelerate that portion to get rid of our oldest ships that are—

it is becoming less and less cost effective to extend them. Then we will continue to look at new build, particularly new build for unique ships, which have unique missions that are not necessarily found on the commercial market.

Senator WICKER. Finally—and I appreciate the indulgence of the chair—I was glad Senator Hirono touched on the *Truman*. Mr. Secretary, this ship needs to be refueled, and if it is refueled, it has got a lot more life in it. Is that correct?

Secretary GEURTS. Yes, sir.

Senator WICKER. Okay, and we have got a year or 2 to reconsider this decision. Do we not?

Secretary GEURTS. Yes, sir. We will have to start ordering some of the advance materials in 2021.

Senator WICKER. 2021, okay.

Secretary GEURTS. Yes. We have kind of got this year, and then decisions after that start to become less and less reversible or most costly to reverse. We made this decision now when we have time to have a—it is an important decision. It is one that requires full debate. We look forward to that. We wanted to make it at a time where we would not have to completely rewrite the budget depending on how that outcomes.

In terms of the near year, I would just say there are some capabilities we believe that are required in the Navy, which we have funded at the expense of that. That was a bold move. That was a difficult decision for us. As we look at that and make decisions, I think it is incredibly important for us to really keep an eye on those capabilities and make sure we preserve the opportunity to continue to explore and bring those complementary capabilities into the naval fleet.

Vice Admiral MERZ. Sir, I would like to just add a clarifying point. The 2021 decision means a PRESBUD 2021 decision. We have this year to reevaluate the path we are on.

Senator WICKER. Well, I think that is an important point to make, and I certainly want us to scratch our heads hard on that.

Thank you very much, gentlemen. General Berger, congratulations on being named Commandant. That was some news whispered to me earlier today.

Thank you, Mr. Chairman, for your indulgence.

Senator PERDUE. I just have one remaining question.

Before I do that, Admiral, would you clarify? I just want to make sure I understood that right for the record that we could expect this force structure report sometime in the next calendar year. Is that correct?

Vice Admiral MERZ. Yes, sir, by the end of the calendar year.

Senator PERDUE. By the end of this calendar year.

Vice Admiral MERZ. Yes, sir, by the end of 2019, we will have the assessment.

Senator PERDUE. Thank you.

Secretary, we have talked about China today. We have not really talked about Russia. The Russian submarine development over the last decade has been pretty impressive, a little scary actually with the development of the Sev submarine class and now the Kalibr missile. Talk a little bit about how that development, in addition

to what we see China doing—how that has affected this particular budget and your strategy going forward.

Secretary GEURTS. Yes, sir. Bill can also give his warfighting perspective.

But I would say taking it up a level, the National Defense Strategy from last year is really focusing us kind of at that global competitive piece. Each competitor brings some unique attributes and risk areas that we watch closely. Our job is to figure out how to take that whole picture and create a force structure that can both be effective and allow us to compete and win, and then from my perspective, efficient and provide value for every dollar the taxpayer puts to this. Both of those are really what we are focused on.

I think Russia is, again, a little bit of a different problem set. They certainly have some niche capabilities that we have got to keep an eye on, and we are doing so. I would say their niche capabilities drive some specific pieces. China's global capabilities kind of drive the overall force set.

But, Bill, you might want to add a specific—

Vice Admiral MERZ. Yes, sir. In this forum, obviously the inability to address specific threats—there is this longstanding mutual respect between Russia and the United States on maritime capability, and it is an influencer on the capabilities we pursue in both quality and quantity.

Senator PERDUE. Senator Hirono?

Senator HIRONO. Thank you. I am done.

Senator PERDUE. Senator Wicker, do you have anything left?

Senator WICKER. Probably, but I—

[Laughter.]

Senator PERDUE. Gentlemen, that concludes the hearing today. I want to thank you for your personal investment today and all the information. This has been a very good hearing.

But more importantly, as leaders of your services, please take back to the sailors and marines out there that we are dead serious about trying to meet the needs of their mission, protect our country. We do not take this lightly. It is a financial issue. It is also a planning issue. We will be earnest partners with you as we try to do that.

God bless you and thank you for today.

[Whereupon, at 11:53 a.m., the Committee adjourned.]

[Questions for the record with answers supplied follow:]

#### QUESTIONS SUBMITTED BY SENATOR TOM COTTON

##### POST-INF EFFECTS ON U.S. MILITARY FORCE STRUCTURE AND READINESS

1. Senator COTTON. Vice Admiral Merz and Lieutenant General Berger, considering that China can field approximately 1,227 medium range ballistic missiles for the price of a single new United States aircraft carrier, without an aircraft or human on it, what steps can the Navy and Marine Corps take to change force structure and operating concepts in a post-INF treaty world?

Vice Admiral MERZ. Great power competition in the maritime domain will require integrated and distributed multi-fleet operations. The Navy Concept for Distributed Maritime Operations (DMO) will increase lethality and guide development of future warfighting capabilities for the Navy. Validation of this concept will occur through operational analysis, modeling and simulation, experimentation, war gaming, and exercises at sea. In the Fiscal Year 2020 budget, the Navy is building capabilities through investments in long range fires, hypersonics, machine learning, additive

manufacturing, quantum computing and directed energy. We are building the fleet across a wide spectrum of platforms including the *Columbia*-class submarine, next generation frigate, and unmanned systems such as the Medium and Large Unmanned Surface Vessels and the Orca Extra Large Unmanned Undersea Vehicle.

Lieutenant General BERGER. The Navy and Marine Corps have developed operating concepts and technologies that expand the competitive space and leverage advantages we hold in agility, dynamic maneuver and resilience. Our forces are testing the ideas provided in Distributed Maritime Operations and Expeditionary Advanced Base Operations. Those sets and reps currently being practiced in wargames and training exercises will inform our force structure and improve the concepts developed. We are investing in the capabilities we need to compete, deter and win in all domains supporting a naval campaign.

2. Senator COTTON. Secretary Geurts and Vice Admiral Merz, how would you define survivability in a post-INF treaty world?

Secretary GEURTS. The definition of survivability remains the same and is made up of three main components: (1) Susceptibility—Avoid taking a hit; (2) Vulnerability—Ability to take a hit and maintain operations; and (3) Recoverability—Ability to recover from a hit. While the post-INF environment presents challenges, not all of our near peer competitors were signatories to the treaty and, as such, have made significant advancements in offensive long range strike. The Navy is working to increase capabilities in each of the survivability areas. Susceptibility is being decreased through increased offensive capability, increased defensive capabilities through improved electronic warfare, counter-ISR, improved hard kill defenses, and increasing the difficulty of engagements through Distributed Maritime Operations. Vulnerability is being improved by building our ships to Naval Combatant Design standards which are updated routinely based on real life incidents and lessons learned. Recoverability becomes more challenging as the threat lethality evolves but improvements in ship design and dissemination of capabilities across the force decreases the impacts of loss to the total force.

Vice Admiral MERZ. The definition of survivability remains the same and is made up of three main components: (1) Susceptibility—Avoid taking a hit; (2) Vulnerability—Ability to take a hit and maintain operations; and (3) Recoverability—Ability to recover from a hit. While the post-INF environment presents challenges, not all of our near peer competitors were signatories to the treaty and, as such, have made significant advancements in offensive long range strike. The Navy is working to increase capabilities in each of the survivability areas. Susceptibility is being decreased through increased offensive capability, increased defensive capabilities through improved electronic warfare, counter-ISR, improved hard kill defenses, and increasing the difficulty of engagements through Distributed Maritime Operations. Vulnerability is being improved by building our ships to Naval Combatant Design standards which are updated routinely based on real life incidents and lessons learned. Recoverability becomes more challenging as the threat lethality evolves but improvements in ship design and dissemination of capabilities across the force decreases the impacts of loss to the total force.

3. Senator COTTON. Secretary Geurts and Vice Admiral Merz, assuming that intermediate range conventional missiles can be networked with smaller, more numerous and distributed multi-mission platform ships, will our definition of survivability for our ships have to change when we look at future conflict?

Secretary GEURTS. At the individual platform level, we don't expect the definition of survivability to change—the Navy will have to assess survivability at the force level to ensure that required capabilities provide complimentary defense and offense in depth and are properly positioned in the Distributed Maritime Operations (DMO) environment to ensure that successful adversary engagements against single platforms do not unacceptably degrade the overall force level capabilities that are required to prevail.

Vice Admiral MERZ. At the individual platform level, we don't expect the definition of survivability to change—the Navy will have to assess survivability at the force level to ensure that required capabilities provide complimentary defense and offense in depth and are properly positioned in the Distributed Maritime Operations (DMO) environment to ensure that successful adversary engagements against single platforms do not unacceptably degrade the overall force level capabilities that are required to prevail.

4. Senator COTTON. Secretary Geurts and Vice Admiral Merz, how do you assess this will impact the “mix” of ships we need in the force?

Secretary GEURTS. The addition of long range strike capability would add another mission area to a multi-mission capable small surface combatant. However, any effect that addition might have on the force mix of ships would be dependent on capabilities/capacities required to achieve objectives in a future joint fight, and on defense leadership decisions on the characteristics of the systems developed and decisions about what platform(s) should host them.

Vice Admiral MERZ. The addition of long range strike capability would add another mission area to a multi-mission capable small surface combatant. However, any effect that addition might have on the force mix of ships would be dependent on capabilities/capacities required to achieve objectives in a future joint fight, and on defense leadership decisions on the characteristics of the systems developed and decisions about what platform(s) should host them.

#### IMPACT OF GREAT POWER COMPETITION ON MILITARY INDUSTRIAL COMPLEX

5. Senator COTTON. Secretary Geurts, what is the risk involved with allowing our subsurface fleet to shrink to 45 vessels in 2030, as compared to a Chinese fleet of 68 in 2025?

Secretary GEURTS. While a detailed discussion of risk is classified, the Navy is doing all it can to manage the impact of reduced submarine inventory. It should also be noted that although submarines play a role in Anti-Submarine Warfare (ASW), Maritime Patrol Aircraft and Surface Combatants are significant contributors to both Theater ASW and Defensive ASW against an adversary's submarine force.

6. Senator COTTON. Secretary Geurts, given the rate of Chinese capacity and capability buildup, how long do you assess we will retain the advantage?

Secretary GEURTS. As the CNO has testified, both China and Russia are deploying all elements of their national power to achieve their global ambitions, and working to redefine the norms of the international system on their terms. This includes creating their own globally decisive naval force, undermining international security and harming our national interests. Additional discussion of this issue would require a classified forum.

#### COLUMBIA AND OHIO-CLASS SUBMARINES

7. Senator COTTON. Secretary Geurts, how important is preserving the nuclear triad to the overall deterrence strategy of the United States?

Secretary GEURTS. Preserving the nuclear triad is essential to effectively deter adversaries. The 2018 Nuclear Posture Review (NPR) confirms the findings of all previous NPRs that the diverse capabilities of the nuclear triad provide the flexibility and resilience needed for deterrence in the most cost-effective manner. The Triad's complementary attributes of assured second strike, promptness, and flexibility, ensure the enduring survivability of U.S. forces against attack and our capability to hold at risk a range of adversary targets in crisis or conflict. No single leg of the triad offers all of these attributes. Eliminating any leg of the triad would greatly ease adversary attack planning and allow an adversary to concentrate resources and attention on defeating the remaining two legs.

8. Senator COTTON. Secretary Geurts, what would cutting this program in half, as some have proposed, do to our ability to deter other nuclear-powered nations from thinking they could attack the United States?

Secretary GEURTS. The Secretary of Defense, in the most recent nuclear posture review, validated the Strategic Command (STRATCOM) requirement for a minimum of twelve *Columbia*-class submarines to meet our Nation's sea-based strategic deterrent requirements. The Navy and STRATCOM determined a minimum of twelve submarines is required through detailed analysis of operational requirements, patrol and maintenance cycles, and current / postulated threats. The Navy can provide the classified analysis supporting this requirement if desired.

9. Senator COTTON. Secretary Geurts, does it make sense to build an additional 4-6 *Columbia*-class submarines, with those subs converted to a conventional guided missile role?

Secretary GEURTS. The four SSGNs now in service retire in the mid-2020s. To meet payload and Special Forces requirements, the Navy is inserting Virginia Payload Modules (VPM) into Block V and VI *Virginia*-class attack submarines beginning in fiscal year 2019. The Navy will make the determination of a new SSGN (next-generation payload-based submarine) after establishing the requirements utilizing the Tactical Submarine Evolution Plan as a guide.

## DEFERRED PROCUREMENT AND INACTIVATION

10. Senator COTTON. Vice Admiral Merz and Lieutenant General Berger, What assessment informed the simultaneous deferred procurement of amphibious ships and inactivation and USS *Harry S. Truman*?

Vice Admiral MERZ. The National Defense Strategy and the Navy Strategy provide the overarching high-level requirements for the Navy the Nation Needs, the Navy's enduring plan for building and sustaining a lethal, resilient force through balanced investments across readiness, capability, and capacity. For the USS *Harry S. Truman*, consistent with the President's recent decision, Navy plans to retain the aircraft carrier and complete her refueling overhaul. The original adjustment was in concert with the Defense Department's pursuit of a more lethal balance of high-end, survivable platforms (e.g. CVNs) and complementary capabilities from emerging technologies. The LPD profile was shifted to balance shipbuilding accounts in support of near-term priorities articulated in the National Defense Strategy. Navy slid the LPD profile right and deferred the fiscal year 2024 procurement to beyond the FYDP.

Lieutenant General BERGER. Per the fiscal year 2020 LRSS SBP, the LPD profile shifted to balance shipbuilding accounts in support of near-term priorities articulated in the National Defense Strategy. The Navy did take risk in capacity within the FYDP in balancing its portfolio in favor of readiness and lethality investments while meeting the fiscal challenge of sustaining the shipbuilding plan. The changes to procurement of amphibious ships were decisions made as a result of balancing those portfolios within the FYDP.

11. Senator COTTON. Vice Admiral Merz and Lieutenant General Berger, was it this same calculus that lead to the addition of a *Virginia*-class submarine in fiscal year 2020?

Vice Admiral MERZ. Yes, the National Defense Strategy (NDS) and the Navy Strategy provide the overarching high-level requirements for all our shipbuilding budget decisions to build the Navy the Nation Needs, the Navy's enduring plan for building and sustaining a lethal, resilient force through balanced investments across readiness, capability, and capacity. Attack submarines are critical enablers of the NDS and represent one of the Nation's most lethal asymmetric advantages. Numerically, attack submarines remain the furthest from the inventory objective. Adding a third submarine in fiscal year 2020 shows our commitment to the industrial base to expand production, and also better balances the total shipbuilding procurement funding over the next five years as the Navy also begins to build *Columbia*-class submarines.

Lieutenant General BERGER. I defer to the Navy as submarines are their program.

12. Senator COTTON. Vice Admiral Merz and Lieutenant General Berger, has it been assessed that it is more critical to fill the capacity gap we currently have in our fast attack submarines, than to maintain the Navy's requirement of 12 aircraft carriers?

Vice Admiral MERZ. No, that is not the assessment or justification for the shipbuilding decisions in the fiscal year 2020 budget request. Both requirements are important to the National Defense Strategy (NDS). In addition to adding a third attack submarine in fiscal year 2020, the fiscal year 2020 budget request also includes a two-ship procurement strategy for Ford-class aircraft carriers (CVN 80 and CVN 81), indicating the central strategic role aircraft carriers will continue to serve in controlling the high-end fight. The Ford class was designed to deliver more capability with more lethal systems and increased power generation while also being more cost-effective than the Nimitz class. In conjunction with this, the Department of Defense is also pursuing portfolio options for strike capabilities from emerging technologies to complement the more lethal balance of high-end, survivable platforms (e.g. CVNs).

Lieutenant General BERGER. I defer to the Navy.

13. Senator COTTON. Vice Admiral Merz and Lieutenant General Berger, has our understanding of the operational environment changed?

Vice Admiral MERZ. The operational environment remains consistent with how it was described in the National Defense Strategy (NDS). The NDS identifies great power competition with China and Russia as DOD's priority and pursues three distinct lines of efforts to expand our competitive space, including rebuilding military readiness as we build a more lethal Joint Force. There is no choice between rebuilding readiness and modernization towards a more lethal fleet—Navy must do both, and each are equally important. This requires Navy to balance its investments in

readiness, capacity (force structure) and advanced capabilities from a warfighting perspective. In addition to the capability challenge of modernizing our force to contend with high-end conflict, the Navy also must contend with regional actors and activities below the level of armed conflict.

Lieutenant General BERGER. Yes. Per service concepts regarding the future A2AD fight, we must establish a forward deployed defense-in-depth, anchored on naval “inside” forces, capable of Expeditionary Advance Base Operations (EABO) and sustained afloat littoral operations in support of the naval campaign. As naval “inside” forces, the Navy-Marine Corps team must develop complementary capabilities to compete, deter, and win in all domains and facilitate the maneuver and projection of Joint Force capabilities. Our warfighting contributions must help shape the strategic environment to prevent conflict. Furthermore, our current investment in resources aimed at operating in and defending sea bases in a contested environment is sound. The Marine Corps, in concert with the Navy, leverages the sea as maneuver space, to support fleet maritime superiority and naval expeditionary operations. The Marine Corps acknowledges that our adversaries continue to invest in A2AD that increasingly jeopardize our maritime dominance—which is why we are increasing our investment in our ability to operate in contested environments to remain relevant and compete with peer competitors.

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SENATOR THOM TILLIS

ANTI-ACCESS AREA DENIAL AND AMPHIBIOUS ASSAULT

14. Senator TILLIS. Lieutenant General Berger, understanding that certain near-peer adversary nations have made significant investments in developing anti-access and area denial (A2/AD) capabilities which could potentially limit the maritime freedom of movement in certain regions, what capabilities would be necessary to set the conditions to project power ashore, and what steps are the USN and USMC taking to develop a future force structure to address these challenges?

Lieutenant General BERGER. We can do this with multi-year procurement profiles for amphibious warfare ships; with procurement acceleration of LH program of record; by accelerating industry production/build times; by developing robust maintenance and modernization facilities; and by integrating evolving, maritime technology with capacity for surge operations. Furthermore, we must: 1) Modernize amphibious warfare ships for integrated or independent lethal self-defense and strike capability and incorporate technologies that enable a “continuous lead-turn” on our adversaries. 2) Return the SSC procurement profile to established POR, and support a “family” of global/regional specialized connector capacity/capability. 3) Sustain MPF and Next Generation MPF that is networked and survivable, and fully capable of at sea arrival, assembly and selective off-load. These platforms must be capable of independent operations and sustain interoperable critical links within the entire battleforce. 4) Ensure resources are sustained for critical afloat and ashore C5I capabilities including capable networks, high throughput (bandwidth) communications in multiple spectrums and waveforms. Common Operational/Tactical Picture and Intelligence Surveillance Reconnaissance (ISR) for Situational Awareness are especially relevant to independent, disaggregated, and special operations.

15. Senator TILLIS. Lieutenant General Berger, do you believe that the current and projected amphibious ship inventory is adequate for meeting USMC training needs and operational life requirements?

Lieutenant General BERGER. No. The amphibious fleet allows the naval force to do three basic things: conduct steady state operations around the world; execute a global cost imposition strategy if we have to fight; and project and sustain the force in a contested environment. The current 30 year SBP accepts risk below the minimum requirement. The current 30 year plan does not achieve and sustain the 38 amphibious warfare ship requirement as stated in the Navy’s 2016 Force Structure Assessment (FSA). The 38 ship requirement in a mix of 12 LH and 26 LPD is still the minimum inventory necessary to sustain global commitments and tasking per the NDS and DPG.

16. Senator TILLIS. Lieutenant General Berger, how would you characterize the current state of U.S. Navy and United States Marine Corps ship-to-shore maneuver including existing equipment shortfalls, and how would you envision the future role for these units?

Lieutenant General BERGER. The current surface connector and ACV strategy will support the Marine Corps’ capability to conduct entry throughout the depth and

breadth of the littorals. These systems specifically enable combat power build up and sustained operations ashore. The 72 non-displacement landing craft (LCAC SLEP/LCAC-100) and the 32 displacement landing craft (LCU/LCU-1700) satisfy near term amphibious warfare modernization goals. The 14 EPFs provide complementary intra-theater lift capability and potential employment options. We must ensure that LCU/LCAC platforms are modernized per the current replacement program to ensure our surface delivery capacity remains capable of supporting global littoral operations. Furthermore, we may need to holistically invest in a family of surface and vertical connectors that provide unique or regional prepositioned or amphibious surge capacities/capabilities that will enable USMC operational concepts for sustained “inside force” activities. These systems will be required to ensure ship-to-shore, shore-to-shore, and shore-to-sea capacity at operational distances for force employment and sustainment, in environments where survivability and reliability, speed and capacity are key within and around the global commons.

17. Senator TILLIS. Lieutenant General Berger, what investments in connectors, fires or other capabilities might be required to ensure a reliable ship-to-shore maneuver capability?

Lieutenant General BERGER. Considering the response to the previous question, investments in connector speed, capacity, endurance, survivability, lethality, and autonomous operations are particular areas of interest. In conjunction with the Navy, we are exploring additional surface platform ideas with increased ranges and the ability to carry and deploy small boats, decoys, weapons/weapon systems, and amphibious vehicles—manned, optionally manned, or autonomous—to allow for additional dispersion of amphibious warfare ships while causing uncertainty for threat targeting systems. Furthermore, additional surface platforms under consideration are Offshore Support Vessels (OSV) and Stern Landing Vessels (SLV), and a NAVSEA SBIR initiative (Modular Buoyant Kit) seeks to provide a ramp support platform to allow for at-sea launch and recovery of small boats and amphibious vehicles from vessels of opportunity in order to increase options for littoral maneuver. It is anticipated that a future family of surface platforms and connectors supported with vertical capability, in concert with other “self-deploying” platforms/connectors, will facilitate maneuver for entry and sustainment within the global commons.

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SENATOR RICHARD BLUMENTHAL

CUTS TO VIRGINIA PAYLOAD MODULE

18. Senator BLUMENTHAL. Secretary Geurts, from a shipbuilding and supply base perspective, what risks and complications should we expect from the decision to take out a *Virginia* Payload Module submarine in fiscal year 2020 and fiscal year 2021?

Secretary GEURTS. The removal of the *Virginia* Payload Modules (VPM) is executable and reduces some schedule risk associated with VPM missile tube hardware deliveries. This will introduce inefficiencies with the shipbuilders and the design yard, as it is more efficient for the shipbuilders to build at a steady cadence of the same configuration through the production line. Disruption to the supply base would be minimal, as suppliers would continue to provide components such as 520-ton air conditioning plants, circuit-D, internal communications system and impressed current cathodic protection system, that would be used to build additional VPM or non-VPM ships. A design change to remove the VPM modifications to the Block V VPM ships would be required, adding to the design and construction complication.

19. Senator BLUMENTHAL. Secretary Geurts, has the Navy already bought *Virginia* Payload Module-specific long lead items for the subs we expected to be outfitted with the *Virginia* Payload Module? Do you have a cost estimate for this change?

Secretary GEURTS. The Navy has procured the Long Lead Time Material (LLTM) for the first three *Virginia* Payload Module (VPM) ships. The LLTM include large forgings, payload tubes, air conditioning (A/C) plants, weapons launch consoles (WLC), and fixtures. The A/C plants and some of the WLCs will be utilized for the fiscal year 2020 non-VPM ship. The other items procured will be utilized in future ships. The cost estimate is currently being evaluated to account for the removal of VPM from a fiscal year 2020 and fiscal year 2021 ship.

20. Senator BLUMENTHAL. Secretary Geurts, without the *Virginia* Payload Module, will our special operations community lose capability?

Secretary GEURTS. The *Virginia*-class SSN (VCS) already supports the special operations community through its inherent design, so there is no impact to SOF by removing the VPM capability from one VCS in fiscal year 2020 and fiscal year 2021. In preparation for the SSGNs retiring starting in 2026, the Navy plans to incorporate additional SOF features into the VCS in fiscal year 2021, mid-Block V.

21. Senator BLUMENTHAL. Secretary Geurts, if we begin cutting *Virginia* Payload Module ships from our *Virginia*-class submarines, are we increasing the risk in the future of a capability gap in our desired cruise missile posture?

Secretary GEURTS. The Navy is committed to replacing the undersea strike volume from our proven *Ohio*-class nuclear-powered, cruise missile-equipped submarines (SSGNs) through the additional capacity provided by the Block V *Virginia*-class Submarines and *Virginia* Payload Module. SSGNs will begin decommissioning in 2026, with all four planned for decommissioning by 2028. Any delays in the procurement or delivery of SSNs with VPM will slow the restoration of the undersea strike volume lost with the decommissioning of the SSGNs.

22. Senator BLUMENTHAL. Secretary Geurts, have you spoken to General Hyten at U.S. Strategic Command or General Thomas at U.S. Special Operations Command about the future consequences or risk of these cuts to their commands?

Secretary GEURTS. The Department of the Navy regularly consults with the combatant commanders when developing future force structure requirements. I, along with the Vice Chief of Naval Operations and our representatives, meet at least quarterly with U.S. Strategic Command as members of the Missile Defense Executive Board (MDEB) and its sub-committees. The MDEB provides recommendations and oversees implementation of strategic policies, program priorities, and investment options in order to promote continued improvement of a ballistic missile defense capability. In addition, the Department interacts regularly with U.S. Special Operations Command (SOCOM) through: the Navy-SOCOM Warfighter Talks, which focuses on SOF–Navy interoperability; the Naval Special Warfare (NSW) Requirements Council, which focuses on requirements and resourcing to support NSW/Fleet integration; and the Undersea Executive Oversight Panel, which focuses on submarine/SOF technical integration.

USS HARRY TRUMAN

23. Senator BLUMENTHAL. Secretary Geurts, you mentioned in your testimony before the Committee that the decision to retire the *Nimitz*-class USS *Truman* while simultaneously requesting two *Ford*-class carriers in this year's budget, was indicative of prioritizing *Ford*-class at the expense of *Nimitz*-class, but was instead the result of a larger set of budget trade-offs. Please elaborate and provide further justification for this budget decision to retire the USS *Truman* at midlife?

Secretary GEURTS. The Navy is implementing the President's recent decision to restore the refueling and complex overhaul (RCOH) for USS *Truman* (CVN 75), and updating our long term procurement plans and force structure accordingly.

**DEPARTMENT OF DEFENSE AUTHORIZATION  
FOR APPROPRIATIONS FOR FISCAL YEAR  
2020 AND THE FUTURE YEARS DEFENSE  
PROGRAM**

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**WEDNESDAY, APRIL 10, 2019**

UNITED STATES SENATE,  
SUBCOMMITTEE ON SEAPOWER,  
COMMITTEE ON ARMED SERVICES,  
*Washington, DC.*

**MARINE CORPS GROUND MODERNIZATION AND NAVAL  
AVIATION PROGRAMS**

The Subcommittee met, pursuant to notice, at 10:02 a.m. in room SR-232A, Russell Senate Office Building, Senator David Perdue (Chairman of the Subcommittee) presiding.

Subcommittee Members present: Senators Perdue, Ernst, Tillis, Hawley, Hirono, Blumenthal and King.

**STATEMENT OF SENATOR DAVID PERDUE**

Senator PERDUE. Good morning.

Before we begin this hearing this morning, I would like to observe a moment of silence for the three marines that we lost this week and the contractor at Bagram Airfield in Afghanistan. Our thoughts and prayers are with the families in this time of loss. So if you will indulge me, I would like us to take a moment of silence. Thank you.

[A moment of silence was observed.]

Senator PERDUE. Thank you.

It is a reminder that this is a dangerous business that you and your men in your commands—men and women in your commands face every day. So our thoughts are with those families.

The Senate Armed Services Subcommittee on Seapower convenes this morning to examine Navy and Marine Corps aviation programs and Marine ground programs in review of the defense authorization request for fiscal year 2020 and the future years defense program (FYDP).

We welcome our four distinguished witnesses: the Honorable James F. Geurts, Assistant Secretary of the Navy for Research, Development, and Acquisition; Lieutenant General David H. Berger, Commanding General of the Marine Corps Combat Development Command and Deputy Commandant for Combat Development and Integration and the nominee to be the next Commandant; Lieutenant General Steven Rudder. We will not talk about call signs for

these next two witnesses this morning. But Deputy Commandant of the Marine Corps for Aviation; and Rear Admiral Scott Conn, Director of Air Warfare for the Office of the Chief of Naval Operations. Thank you for being here this morning, gentlemen.

In this subcommittee's first public meeting, we received testimony regarding shipbuilding, which provided great insight into how the Department is addressing this era of great power competition, as described in President Trump's National Defense Strategy (NDS).

In this hearing, we intend to further that effort and focus on naval aviation, as well as Marine ground programs. Specifically, we hope to address how the Navy and Marine Corps are adjusting their aviation and ground modernization strategies to support the National Defense Strategy.

The world is more dangerous now than anytime in my lifetime in my opinion. We face complex threats from China, North Korea, Russia, Iran. Now more than ever, our Navy and Marine Corps need capable fleets and robust air and ground force capabilities in order to deter aggression, project power, and support our allies.

Not since the end of the Cold War has air power been forced to operate in a contested environment both to project power and to provide fleet defense. The ability to operate in a complex threat environment requires the Navy to develop and field cutting edge capability while modernizing current weapon systems and maintaining an extremely high level of training and readiness.

I look forward to hearing from our witnesses today about the Navy and Marine Corps plans to balance these competing priorities to balance a more modern and lethal force as quickly as possible.

Additionally, I would like to review a number of other aviation-related topics, including the future carrier air wing and the balance of fourth and fifth generation aircraft, as well as manned/unmanned teaming with unmanned aerial vehicle (UAV); depot maintenance capability and performance to ensure our weapon systems are ready for the high end fight; next, F-35 integration into the fleet and its performance both deployed and in training; next, psychological episodes in the Navy and Marine Corps aircraft—I am sorry—physiological episodes in the Navy and Marine Corps aircraft actions underway to solve underlying issues.

The threats posed by our adversaries equally apply to the Marine Corps ground elements. The ground combat element and logistics combat element, two critical parts of the Marine Air Command Task Force, must also modernize to meet these new threats while maintaining a high level of readiness. I look forward to hearing how the Marine Corps intends to modernize and field new equipment to meet challenges facing the future battlefields and ensure our marines have the tools they need to win in battle.

This subcommittee will continue to work with the Navy and Marine Corps to build aviation and ground capabilities ready to defend our national interests, while demanding the best use of every taxpayer dollar.

I look forward to our witnesses' testimony.

I now recognize Ranking Member Senator Hirono.

**STATEMENT OF SENATOR MAZIE K. HIRONO**

Senator HIRONO. Thank you very much, Mr. Chairman.

And I also welcome our witnesses this morning. Thank you for your service.

I echo a lot of what the Chairman has always said, but repetition is also good because it sticks in our minds.

So in today's discussion, we will examine how the Department of the Navy's fiscal year 2020 budget request for Navy and Marine Corps aviation programs would help increase readiness, address shortfalls in munitions, pilots, and maintenance personnel, and modernize our strategic deterrence capabilities. We will also hear from our witnesses about how the budget request supports Marine Corps ground modernization programs. Navy and Marine Corps aviation programs play a critical role to supporting and advancing our country's strategic interests in the Indo-Pacific region, including from bases in Hawaii.

As we consider the fiscal year 2020 budget, we need to consider the significant challenges we face in naval aviation. In particular, we need to hear more about how the new National Defense Strategy will impact the Department of the Navy's aviation programs. One such challenge will be meeting the guidance of the Secretary of Defense to achieve a level 80 percent readiness in the tactical aviation inventory.

Another challenge will be to ensure that our flying operations are as safe as we can make them. We all understand that flying operations are inherently dangerous. Nevertheless, our hearts are touched whenever we lose any of our brave men or women in training operations, and specifically we regret the recent loss of the AH-1 crew in Yuma, Arizona. I hope you will extend our condolences to their families.

In a broader sense, we need to understand whether there may be some pattern accidents in Marine Corps or Navy air operations. Navy and Marine Corps pilots have been experiencing problems with the environmental control systems in certain aircraft, mainly F-18's and T-45's, that have resulted in what the Chairman referred to as physiological episodes. While most of these episodes have not led to accidents, they are troubling nonetheless.

Last year, we enacted a provision in the fiscal year 2019 NDAA that establishes a national commission on military aviation safety to review aviation safety issues. In particular, this commission is charged with reviewing the rates of military aviation mishaps between fiscal years 2013 and 2018 compared to historical aviation mishap rates and making an assessment of the underlying causes contributing to unexplained physiological episodes. The commission is not due to report its findings until March 2020. So we need to be sure that the Navy and Marine Corps are taking appropriate measures to reduce accidents in the meantime.

In recent years, naval aviation has faced challenges of a high operational tempo and uncertainty in the fiscal environment. We need to hear from the services what progress is being made to address these problems.

I would also like to discuss what the Department of the Navy is doing to address corrosion, a significant issue that costs the Department \$20 billion a year. I will continue to support efforts to

help prevent and treat corrosion, to mitigate its impact on the readiness of our forces.

This hearing will also provide a chance to discuss some of the ongoing issues with the F-35 program. I am interested in learning more about how the Navy and Marine Corps view the F-35 Joint Program Office's plans to modernize the F-35 fleet on a faster pace than was envisioned for the original block 4 upgrade program.

I would also like to hear about the investments the Navy and Marine Corps are making in training and maintenance operations, as well as about problems in the Marine Corps CH-53K program and what steps the Department is taking to correct the cost growth and schedule delays in this program.

Finally, as we evaluate the budget request for the Marine Corps, we must also make sure our marines have modernized ground platforms. The fiscal year 2020 budget request includes \$3.1 billion for Marine Corps procurement and \$623 million for research, development, test, and evaluation funding. The budget request supports the continued development of the amphibious combat vehicle (ACV). The ACV is a new armored personnel carrier, and it will support expeditionary maneuver warfare for ground combat forces. In addition, the Marine Corps continues to procure a joint light tactical vehicle, which provides increased protection and performance over the legacy Humvee fleet. I welcome an update from our witnesses on the status of both of these programs.

Thank you again, Mr. Chairman, and I look forward to hearing from the witnesses.

Senator PERDUE. Thank you.

I think, Secretary Geurts, you have an opening statement?

**STATEMENT OF THE HONORABLE JAMES F. GEURTS, ASSISTANT SECRETARY OF THE NAVY FOR RESEARCH, DEVELOPMENT, AND ACQUISITION; ACCOMPANIED BY LIEUTENANT GENERAL DAVID H. BERGER, USMC, COMMANDING GENERAL, MARINE CORPS COMBAT DEVELOPMENT COMMAND AND DEPUTY COMMANDANT FOR COMBAT DEVELOPMENT AND INTEGRATION; LIEUTENANT GENERAL STEVEN R. RUDDER, USMC, DEPUTY COMMANDANT FOR AVIATION, HEADQUARTERS UNITED STATES MARINE CORPS; AND REAR ADMIRAL SCOTT D. CONN, USN, DIRECTOR, AIR WARFARE, OFFICE OF THE CHIEF OF NAVAL OPERATIONS**

Secretary GEURTS. Yes, sir.

Chairman Perdue, Ranking Member Hirono, and distinguished Members of the Subcommittee, thanks for the opportunity to appear before you today to address the Department of the Navy's fiscal year 2020 budget request.

Joining me today are Lieutenant General Dave Berger, Deputy Commandant for Combat Development and Integration; Lieutenant General Steve Rudder, Deputy Commandant for Aviation; and Rear Admiral Scott Conn, Director of Air Warfare.

With your permission, I intend to provide a few brief remarks and put my statement in for the record.

Senator PERDUE. Yes, sir.

Secretary GEURTS. I would like to start by thanking the subcommittee and all of Congress for passing the 2019 bill on time.

On-time receipt of the full budget allowed us to expedite the delivery of lethality and readiness to our sailors and marines while achieving cost savings through more efficient contracting and more efficient programs. It also helped stabilize the industrial base and supply base, both of which are key to our success.

While we gain great benefit from an on-time 2019 budget, we are once again threatened by the prospect of returning to harmful effects that impact our service readiness and our modernization as a result of a continuing resolution for the coming year. Budget uncertainty associated with a continuing resolution adds instability, inefficiency, delays contracting, and delays fielding of critical capabilities while introducing unneeded risks into warfighting readiness.

Even more devastating to our recovery would the return of Budget Control Act (BCA) limitations. Budgets commensurate with the sequestration caps would not only immediately reverse the progress we have made to date but would inflict a disastrous impact on our future readiness and modernization.

Our 2020 budget request recognizes our continued focus to fully restore our readiness while ensuring we develop and field the technologies and capabilities that will ensure we maintain our competitive military advantage. The budget submission delivers the aviation and ground vehicle readiness and modernization investments required to deliver on the National Defense Strategy. It demonstrates our continued commitment to ensuring our sailors and marines have the equipment they need to execute our national security.

While we are here to discuss our 2020 budget request, I would also like to recognize the sailors and marines who are engaged in combat and operational activities around the world as we speak, three of which gave the ultimate sacrifice earlier this week. Thank you, sir, for recognizing them at the beginning of this hearing. We keep their loved ones and their teammates in our thoughts and prayers.

We have also offered our full support to our Japanese partners as they lost an F-35 earlier this week, and we are committed to giving them all the support we can as they work through that issue.

Thank you for the strong support this committee has always provided our sailors and marines, and thank you for the opportunity to appear before you today. We look forward to answering your questions.

[The prepared statement of Secretary Geurts and Lieutenant General Berger to follow, followed by the prepared statement of Secretary Geurts, Lieutenant General Rudder, and Rear Admiral Conn follow:]

JOINT PREPARED STATEMENT BY THE HONORABLE JAMES F. GEURTS AND  
LIEUTENANT GENERAL DAVID H. BERGER

INTRODUCTION

The 2018 National Defense Strategy (NDS) identifies a requirement for forward-deployed naval forces that can compete against, deter, and if necessary defeat peer adversaries. As an essential element of those naval forces, Fleet Marine Forces must provide stand-in capabilities to the fleet to facilitate sea denial and sea control oper-

ations as part of an integrated naval defense-in-depth or broader naval campaign. Furthermore, the National Defense Strategy clearly identifies the need for change—and rapid change in the form of accelerated modernization in order to arrest and reverse any erosion of our competitive naval advantage. This includes major changes to your naval expeditionary force-in-readiness—the United States Marine Corps.

Fleet Marine Forces Marines (FMF) must be able to persist inside an adversary's weapons engagement zone (WEZ) as stand-in forces to facilitate the application of lethal stand-off forces and capabilities, while simultaneously supporting broader fleet actions. Whether organized as part of an Expeditionary Strike Group, Amphibious Ready Group, or FMF capability ashore, Marine forces require significant modernization to maintain overmatch of emerging threats and support increasingly contested and distributed naval operations globally. While our initial service modernization efforts prior to the release of the NDS focused primarily on our Information Warfare capabilities and our Command Element, since its release we have prioritized modernization efforts which directly enhance the lethality of naval forces, facilitate distributed fleet operations, and accelerate the development of capabilities identified in concepts such as Distributed Maritime Operations and Expeditionary Advance Base Operations.

#### OUR 2020 BUDGET

“Competing with a Peer Threat” is the theme of our fiscal year (FY) 2020 budget submission, and directly aligns with the Secretary of Defense's guidance to increase lethality, improve warfighting readiness, and achieve program balance. This year's submission focuses on three key budget priorities—modernization, readiness, and manpower. Through divestiture of legacy systems which fail to provide overmatch against a peer adversary; key investments in manned-unmanned teaming and autonomous systems which facilitate sea control and sea denial; and programmatic reforms, we are transforming today's Marine Corps into the future Fleet Marine Forces required by the Navy and larger Joint Force. To accomplish this goal, we require adequate, sustained, and predictable funding; as well as your continued support for divestments needed in order to modernize the force.

Accelerated and focused modernization remains critical to meeting the demands of a strategic environment marked by peer adversaries with access to advanced, lethal, and disruptive capabilities attempting to create strategic dilemmas through fait accompli scenarios. Forward-deployed Fleet Marine Forces operating afloat or ashore as an extension of the fleet with modern capabilities can prevent such strategic dilemmas through deterrence by denial, and if required—deter via punishment along with the rest of the fleet. As previously noted by the Commandant during testimony, we need a force capable of denying freedom of naval maneuver to deter our adversaries; or, as necessary, a Corps capable of exploiting, penetrating, and degrading advanced adversary defenses in all domains in support of Naval and Joint Force operations.

In order to achieve the modern and lethal naval force required, we must experiment with new technologies available on the market, and then deliver the most promising of those capabilities to the force quickly to take advantage of the rapid rate of technological change. The Marine Corps Rapid Capabilities Office (MCRCO) makes this possible, seeking emergent and disruptive technologies to increase our lethality and resiliency. The MCRCO leverages authorities provided in the fiscal year 2016 and fiscal year 2017 National Defense Authorization Acts and develops partnerships to accelerate the requirements development and definition process. With the consistent and steadfast support of Congress, we will continue to fully fund this office. We also embrace the idea of alternative acquisition pathways. We are using and seeing value in Other Transaction Authority and intend to apply middle tier rapid fielding authority at the first appropriate opportunity as a solution to expedite modernization, where production is achievable within five years or less. We look forward to working with this Committee to identify additional opportunities to accelerate our acquisition processes.

The following capability areas and ground programs support the rebuilding a 21st century Fleet Marine Force necessary to facilitate fleet operations in contested maritime spaces.

#### *Long Range and Precision Fires*

The NDS, as well as emerging naval concepts, identify the need for naval forces capable of conducting lethal strikes at range, in depth, and with precision in support of sea control and sea denial missions. Marine Corps ground modernization efforts in long range precision fires will enable our ground forces to contribute to Naval Integrated Fire Control-Counter Air (NIFC-CA) and Army shore-to-shore Long-Range Precision Fires capabilities.

In coordination with the Navy, the Marine Corps is pursuing the integration of offensive anti-surface warfare (OASuW) capabilities into traditional ground formations. The Navy/Marine Corps Expeditionary Ship Interdiction System is a near term development of a ground-based anti-ship missile capability that will soon enable the Fleet Marine Forces to contribute to sea control/sea denial in support of a maritime campaign, as an element of the joint force. These forward deployed capabilities, ashore and afloat, will enable our fleets to deny adversary use of key maritime areas or terrain, supporting the concept of distributed maritime operations, with increased fire support precision, range, and lethality.

We continue to expand our rocket artillery capacity through additional investments in High Mobility Artillery Rocket System launchers and communications equipment in support of the activation of 5th Battalion 10th Marines, which will reach initial operational capability in fiscal year 2021. This battalion will expand long range precision fires capability of Fleet Marine Forces based in Camp Lejeune, North Carolina, and supporting 2nd and 6th Fleets.

The Marine Corps is also working closely with the Army to develop longer range cannon and rocket systems and projectiles, such as the M777 Extended Range, supercharge cannon propellant, XM1128 base bleed projectile, XM1113 rocket assisted projectile, and Guided Multiple Launch Rocket System Extended Range rockets in support of sustained operations ashore. These modernization efforts could double the range of current cannon and rocket artillery systems. Furthermore, we are participating in the Army's Cannon-Delivered Area Effects Munition efforts to work toward a replacement for Dual Purpose Improved Conventional Munitions. Each of these efforts provide opportunity to work jointly toward common capability requirements while minimizing overall costs.

#### *Protected Mobility/Enhanced Maneuver*

To distribute and concentrate FMF ashore, we must be able to maneuver to positions of advantage, and engage and defeat threat forces in all geographic, topographic, and climatic environments from contested littoral waterways to complex urban environments occupying key terrain in relation to maritime spaces. Our ground combat and tactical vehicle modernization programs will replace legacy in our inventory while also providing key mobility enablers supporting the full range of future operational capabilities.

The Department of the Navy's and Marine Corps' highest Ground Combat and Tactical Vehicle modernization priority is replacement of the legacy Amphibious Assault Vehicle (AAV) with the Amphibious Combat Vehicle (ACV). In June of 2018, the ACV program achieved Milestone C and awarded BAE Systems the production and deployment phase contract. During the fall of 2018, ACV 1.1 prototypes demonstrated satisfactory water mobility performance in high surf conditions, and in doing so met the full water mobility transition requirement for ACV 1.2 capability. Subsequently, the Milestone Decision Authority (ASN(RD&A)) approved the consolidation of increments one and two into a single program to enable continuous production of ACVs to completely replace the AAV. The next key acquisition event is the Full Rate Production decision scheduled for the third quarter of fiscal year 2020 following Initial Operational Test & Evaluation. ACV remains on schedule to achieve Initial Operational Capability in the fourth quarter of fiscal year 2020.

Our second highest priority remains the replacement of the legacy high mobility, multi-purpose, wheeled vehicle (HMMWV) inventory to support sustained operations ashore. In partnership with the Army, we have sequenced the Joint Light Tactical Vehicle (JLTV) program to ensure affordability in conjunction with the execution of the ACV program. This approach enables an affordable, incremental, and simultaneous modernization of the two most stressing gaps within the Ground Combat Tactical Vehicle portfolio. We have initiated fielding the JLTV, and new equipment training is underway. The next key acquisition event is the Full Rate Production decision planned for May. Initial Operational Capability remains on schedule, and, by the end of July the Third Battalion, Eighth Marines will be the first operational unit equipped with JLTV as it prepares for its next rotation with the Amphibious Ready Group/Marine Expeditionary Unit.

#### *Air Defense*

Forward deployed and stationed naval forces ashore are vulnerable to attacks by adversaries with ready access to cheap asymmetric capabilities—whether traditional rockets or unmanned systems that have proven in recent conflicts to be both lethal and highly disruptive. Lacking the protection and requisite resilience necessary to mitigate and defeat these threats, we are investing heavily in modernizing and expanding our air defense capabilities ashore. We aggressively developing the Marine Air Defense Integrated System (MADIS) Family of Systems (FOS) to provide the

naval force with an ability to detect, track, identify, and defeat UAS, rotary and fixed wing aircraft. Coming in multiple configurations, the MADIS FOS includes a JLTV-based variant to defend maneuver forces against Unmanned Aircraft Systems (UAS), fixed and rotary wing aircraft, as well as a variant that provides all Marine Corps Installations, both CONUS and OCONUS, with a counter UAS capability specially tailored to match the needs of each installation.

We have further identified the need for an expeditionary cruise missile defense system to facilitate naval operations and further support Fleet Marine Forces persisting inside the WEZ; thus, we are investing in a Medium Range Intercept Capability (MRIC). Integrated with the Common Aviation Command and Control System (CAC2S), Ground/Air Task Oriented Radar (G/ATOR) and other sensors, the MRIC will defend Fleet Marine Forces from a wide array of cruise missiles and other aerial threats, providing protection of critical assets and enabling the force to execute Expeditionary Advance Base Operations.

#### *Command and Control (C2) in a Degraded Environment*

Fleet Marine Forces require a sustainable, defendable, and resilient C2 network, integrated with Navy and Joint Force networks, which allows for timely and persistent information exchange while enhancing battlefield awareness to dispersed tactical units. Critical to the success of our support to the fleet is our ability to coordinate and synchronize our distributed C2 sensors and systems. Our modernization priorities in this area are G/ATOR and CAC2S. These systems will provide modern, interoperable technologies to support real-time surveillance, detection and targeting, and common aviation C2 suite to enable the effective employment and information sharing of that and other sensors and C2 suites across the force.

G/ATOR ensures Fleet Marine Forces will be in full control of designated airspace, and provides FMF commanders the freedom of action to employ organic surface and air fires. G/ATOR Block II will acquire threat indirect fire systems at much greater ranges than currently fielded radars. The principal functions of G/ATOR Block II will be to detect, track, classify, and accurately determine the origin of enemy projectiles. G/ATOR detects the most challenging air threats to the FMF, and will outpace the threat for years to come.

CAC2S provides the tactical situational display, information management, sensor and data link interface, and operational facilities for planning and execution of Marine Aviation missions in support of the fleet. CAC2S will eliminate the current stove-piped, dissimilar legacy systems and will add capability for aviation combat direction and air defense functions by providing a single networked system. CAC2S will be the primary C2 system that integrates Marine aviation operations with Joint, combined, and coalition aviation C2 agencies.

Networking on the Move is a C2 capability integrating tactical data systems with satellite communications for Beyond Line of Sight uninterrupted two-way access to digital data, with full Common Operational Picture access, virtually unlimited situational awareness and a powerful ability to issue digital orders (fires, maneuver, planning) to ground, air, and logistic units anywhere on the battlefield while on-the-move or at-the-halt.

#### *Operations in the Information Environment (OIE)*

Adversary use of “information” to manipulate facts, mobilize mass perceptions, and contest our ability to C2 forces undermines our traditional military advantages. We cannot count on uncontested access to the electromagnetic spectrum any more than we can count on uncontested freedom of maneuver at sea. Our Electronic Warfare Ground Family of Systems (MEGFOS) is being developed to employ a common backplane hardware infrastructure, which enables plug & play capability, using software defined transceivers, amplifiers, and specialized modules to provide upgradable, networked electronic warfare systems for use across the FMF—on tactical vehicles, by dismounted Marines, and at Expeditionary Advance Base sites. MEGFOS will operate across a wide range of frequencies in order to provide the FMF the ability to maneuver and fight in and through the electromagnetic spectrum. Our transition to MEGFOS will be via the Multi-Function Electronic Warfare (MFEW) program which modernizes Counter Radio-Controlled Improvised Explosive Device—Electronic Warfare (CREW) systems to provide networked and distributed MFEW capabilities to sense and attack the adversary while providing protection from a multitude of advanced spectrum reliant threats.

We are making rapid progress in the use of UAS to conduct Intelligence, Surveillance, and Reconnaissance, defend our troops in harm’s way, build battlefield Situational Awareness, and prosecute targets of opportunity. We are currently fielding small UAS (sUAS) to every infantry battalion for conducting Reconnaissance, Surveillance, and Target Acquisition, for enhancing the reach of current communica-

tions equipment, and for use in training for countering enemy UAS platforms. We are using some commercial off-the-shelf systems as well as systems produced through the use of additive manufacturing. Simultaneously, we continue to advance the digital interoperability between these systems and digital communications systems in order to synchronize as well as control sUAS platforms.

#### *Logistics*

In a mutually contested maritime environment, logistics takes on greater significance; especially for distributed naval forces operating inside the WEZ. Global awareness, diversified distribution, improved sustainment, and optimized installations are key enablers to sustained operations. This requires innovative methods, the ability to leverage new technologies, and continued naval integration as well as integration with Joint and Coalition forces. Science and technology efforts in additive manufacturing have resulted in advanced manufacturing techniques, and must include reverse engineering, prototype development, small to large scale fabrication, and development of new approaches. As a result, we have procured 160 3D printers, with more than 125 ground and 83 NAVAIR-approved aviation parts; immediately improving readiness and lethality. Additional investments in enhanced command and control for logistics systems, unmanned transportation and storage of bulk fuel, and a broader unmanned logistics systems—to include quadrotor cargo delivery systems and littoral connectors—are paving the way in Next Generation Logistics capabilities. Our logistics modernization efforts include the development of autonomous ground, surface and sub-surface materiel distribution systems. These include the development of autonomous ground, surface and sub-surface materiel distribution systems; development of operational and tactical, in-field digital fabrication capabilities; and the development of sensor-driven logistics information technologies.

#### SUMMARY/CONCLUSION

In conclusion, the Marine Corps and our Fleet Marine Forces must accelerate modernization efforts, and prioritize those initiative and programs which increase the lethality of our stand-in forces, those Fleet Marine Forces inside the WEZ, in order to more effectively support distributed maritime maneuver and compete and deter. To achieve this end, we will continue to transition from today's "1.0 force" to a near-term "1.1" modernized force that leverages select, existing platforms to achieve new warfighting concepts; and ultimately, to a "2.0 future force" with revolutionized capabilities required to create the competitive overmatch desired by the NDS. While we are clear on what success looks like for the future naval force and Fleet Marine Force, as well as the path and sequence of events necessary to cause our desired outcomes; there are many obstacles to overcome, and we will need your continued support in order to succeed. As we accelerate modernization and identify new capabilities which create overmatch, we will have to make decisions regarding capacity reductions, changes to programs-of-record, and potentially seek outright divestments of legacy capabilities. These divestments will be required to secure sufficient funding for our modernization. Your continued oversight and support will be essential. In closing—accelerated modernization is the most effective remedy to the problems and challenges identified in the NDS, as well as the appropriate remedy to our long-term readiness problems.

JOINT PREPARED STATEMENT BY THE HONORABLE JAMES F. GEURTS, LIEUTENANT  
GENERAL STEVEN RUDDER AND REAR ADMIRAL SCOTT CONN

#### INTRODUCTION

Mr. Chairman, Ranking Member Hirono and distinguished Members of the Subcommittee, thank you for the opportunity to appear before you today to discuss the Department of the Navy's (DON) fiscal year 2020 aviation programs. Our budget request aligns to the current National Defense Strategy where great power competition remains the central challenge to U.S. prosperity and security. A resurgent Russia and a rapidly growing China continue their aims to displace American influence from critical regions around the globe, undermine our alliances, and coerce our regional allies and partner nations. Both nations, and their proxies, are attempting to challenge us in all warfighting domains, none greater than on the seas and in the air.

Our fiscal year 2020 budget request recognizes that we are still emerging from a period of strategic and resource atrophy instilled under the Budget Control Act (BCA). Sequestration budget caps resulted in a significant erosion of readiness and the loss of some of our competitive military advantage. To address the challenges of great power competition, and overcome the results of the BCA, we require pre-

dictable and on-time budgets commensurate with the challenges we face together as a nation. Receipt of an on-time budget in fiscal year 2019 was extremely helpful and most appreciated by the Department. Budgets commensurate with sequestration caps would only undermine the progress we have made and inflict significant damage to Naval Aviation; the return to Continuing Resolutions would only add instability and induce higher programmatic and warfighting risks.

Our fiscal year 2020 investments are focused, balanced and prioritized to deliver a ready, capable, global sea-based and expeditionary force. We request your support for the continued transition of the major components of the Carrier Air Wing (CVW), Expeditionary Strike Group, Amphibious Ready Group, and land-based Expeditionary Wings. We appreciate the support of Congress to help us improve our readiness posture and ask for your continued support as we expand on the assimilation and teaming of manned and unmanned systems and further mature the integration of advanced platforms, sensors, networks, electromagnetic spectrum, and strike weapons that provide the necessary military advantage over those challenging the global posture.

China is innovating faster than we are and fielding significant warfighting capabilities. To address the pace at which they are progressing we cannot continue to develop weapon systems under a procurement acquisition system with its foundations from the Cold War (or earlier). We appreciate your continued support for the use of accelerated acquisition authorities Congress provided under the fiscal year 2017 National Defense Authorization Act. While we are still maturing the use of these authorities, we have seen positive results of accelerated acquisition processes. We developed and fielded an Early Operational Capability of the Long-Range Anti-Ship Missile in approximately four and one-half years as compared to eight years (or longer) under traditional processes. Furthering that success, we are developing MQ-25A as a maritime accelerated acquisition program and the Next Generation Jammer Low Band is being considered for a Middle Tier (Section 804) program.

Mr. Chairman, we are planning for a strategic environment that continues to be complex, uncertain, and technologically advanced. Our National Defense Strategy directs the development and operations of a more lethal and ready force, prepared to defeat adversaries in high-end combat. With the proliferation of modern conventional and cyber weapons, from both state and non-state actors, we anticipate continued challenges to our global influence across a large operational continuum. But with the sustained support of Congress, we can continue progressing along the path that addresses these needs, restores our competitive naval advantage, enhances global deterrence, and ensures Naval Aviation remains uncontested in an increasingly complex global security environment.

#### TACTICAL AVIATION

##### *Strike Fighter Inventory Management Overview*

The Naval Aviation Enterprise continues to actively manage strike fighter inventory challenges. However, the key enabler will be stable, on-time funding over multiple years to achieve the desired results.

The fiscal year 2020 request continues the Department's momentum in reducing strike fighter inventory shortfall with procurement of 10 F-35Bs, 20 F-35Cs, 24 FA-18E/F Block III Super Hornets and additional aircraft across the Future Years Defense Program. In tandem with these procurements, Service Life Modernization initiatives and capability upgrades enhance our inventory by maintaining the tactical relevance of the F/A-18 E/F and legacy F/A-18 A-D aircraft.

The Navy continues its accelerated divestiture of legacy Hornets with the last fleet and training squadron completing transition to F/A-18E/F in 2019, followed by the Reserve component in 2025. To maximize the overall readiness capacity of the Department, F/A-18 A-D aircraft will be transferred to the Marine Corps, the Naval Aviation Warfighting Development Center and Naval Reserves. Based on operational and flight test requirements, the Department will maintain a portion F/A-18 A-D aircraft for the Marine Corps and Navy test squadrons through 2030.

##### *F-35 Joint Strike Fighter*

The F-35 Lightning II will form the backbone of U.S. air combat superiority for decades to come. Whether the mission requires the execution of strike, close air support, counter air, escort, or suppression of enemy air defenses, both the F-35B and F-35C are vital to our future as they become the lethal cornerstone of our naval air forces. The Navy and Marine Corps will transition 25 squadrons over the next 10 years as we replace our aging legacy fleet.

The Marine Corps has already established one Fleet Replacement Training Squadron, one operational test squadron, and three operational line squadrons, with

USMC F-35Bs already operating in support of two different Marine Expeditionary Units/ Amphibious Readiness Groups from Amphibious Assault Ships (LHDs). The Navy declared F-35C Initial Operating Capability (IOC) in February 2019. Continuing to deliver this transformational capability to Navy and Marine Corps front-line forces as soon as possible remains a top priority.

The DON is committed to reducing F-35 costs. The Department's goal is to reduce the flyaway cost of the Marine Corps F-35B to be no greater than \$104 million dollars and the Navy F-35C cost to be no greater than \$98 million dollars no later than Low Rate Initial Production (LRIP) Lot 14. We are also working to decrease operation and sustainment costs by 27 percent over current projections.

The baseline program has delivered over 250 aircraft to test, operational, and training sites (all variants). The F-35 program continues to mature with base stand-up, sustainment of fielded aircraft and maturation of the global sustainment enterprise.

The fiscal year 2020 President's budget requests \$4.7 billion in Aircraft Procurement funds (APN) for 10 F-35B and 20 F-35C aircraft, modifications and spares.

#### *F-35 Continuous Capabilities Development and Delivery (C2D2)*

With the F-35 program soon closing Block 3F System Development and Demonstration, we must continue to modernize the aircraft with advanced capabilities to maintain the advantage over advancing adversary fighters and ground-based radar threats.

Towards that end, the Department restructured the original Block 4 Follow-on Modernization acquisition strategy into a more agile Continuous Capabilities Development and Delivery (C2D2) model. The C2D2 approach leverages commercial practices, develops capability in smaller, more easily managed increments, and accelerates delivery of warfighting capability. The approach also advances departmental goals of reducing C2D2 risk and lowering cost. In support of fiscal year 2020 C2D2 ramp-up the DON requests \$806.6 million in Research, Development, Test, and Evaluation funds (RDT&E).

#### *F/A-18 A/B/C/D Hornet*

Service Life Extension Program (SLEP) efforts extended the F/A-18 A-D beyond its original service life of 6,000 hours to 8,000 hours, and in select aircraft, up to 10,000 flight hours. Along with flight hour extensions, these aircraft require capability upgrades to maintain tactical relevance as the Marine Corps plans to fly a portion of the legacy F/A-18 A-D fleet through the fiscal year 2030 timeframe to bridge the transition gap to an F-35B/F-35C fleet.

The fiscal year 2020 budget requests \$228.8 million in APN to implement aircraft commonality programs, enhance capability, improve reliability, and ensure structural safety of the F/A-18 A-D inventory, and \$101.0 million for the continuation of the Hornet SLEP.

#### *F/A-18E/F Super Hornet*

The F/A-18E/F Super Hornet will be the numerically predominant aircraft in CVWs into the 2030s. Continued investment in new aircraft, capability enhancements and flight hour extensions significantly improves CVW lethality.

In the second year of what will be a 72 aircraft Multi-Year Procurement (MYP), the fiscal year 2020 President's Budget requests \$1.80 billion in APN for procurement of 24 F/A-18E/F Block III Super Hornet aircraft and \$201.5 million of RDT&E for improvements, RADAR upgrades and Block III development.

#### *AV-8B Harrier*

The fiscal year 2020 budget requests \$27.4 million in RDT&E funds to continue design, development, integration and test of platform improvements. These improvements include continuation of an Engine Life Management Program, Escape System upgrades, Joint Mission Planning System updates, Link-16 Digital Interoperability (DI) integration, Operational Flight Program block upgrades (mission and communication systems), navigation improvements, weapons carriage updates, countermeasure improvements, and updates to an Obsolescence Replacement/Readiness Management Plan.

The fiscal year 2020 budget also includes \$39.5 million in APN to continue the incorporation of Obsolescence Replacement/Readiness Management Plan systems, electrical and structural enhancements, LITENING Pod upgrades, F402-RR-408 engine safety and operational changes, DI upgrades that include Link 16, and inventory sustainment and upgrade efforts to offset obsolescence and attrition.

*Next Generation Air Dominance (NGAD) Family of Systems*

The Department is continuing a Next Generation Air Dominance (NGAD) Analysis of Alternatives (AoA) to address the anticipated retirement of the F/A-18E/F and EA-18G aircraft in the 2030s.

The Joint Chiefs of Staff approved the Initial Capabilities Document that frames NGAD study requirements to support the full range of military operations from carrier-based platforms. The AoA is considering the widest possible range of materiel concepts while balancing capability, cost/affordability, schedule, and supportability. It will assess manned and unmanned approaches to fulfill predicted 2030+ mission requirements. Analyses will consider baseline programs of record (current platforms), evolutionary or incremental upgrades to baseline programs (including derivative platforms), and new development systems or aircraft to meet identified gaps in required capability. We anticipate the NGAD AoA to report out during fiscal year 2019.

## AIRBORNE ELECTRONIC ATTACK (AEA)

*EA-18G Growler*

The EA-18G Growler is a critical enabler for the Joint force as it brings fully netted electronic warfare capabilities to the fight, providing essential capabilities in the Electromagnetic Maneuver Warfare environment.

The EA-18G program will complete deliveries in July 2019 bringing the total procurement quantity to 160 aircraft. This fulfills current Navy requirements for AEA for nine CVWs and five expeditionary squadrons plus one reserve squadron. The fiscal year 2020 President's Budget requests \$143.6 million of RDT&E for additional modernization to ensure the EA-18G maintains its edge in the electromagnetic spectrum by providing robust sensing and engagement capabilities.

*Next Generation Jammer (NGJ)*

The NGJ is the follow-on to the legacy AN/ALQ-99 initially fielded in 1971 and is critical to the Navy's maritime fight. As adversaries continue to make significant investments to improve their Electronic Warfare capabilities, the Navy must be able to counter these threats to maintain its operational advantage. The ALQ-99 has reached capability limits both technologically and materially and is challenged against modern radar threats and communication systems. NGJ is a critical capability designed to address dynamically evolving threats and provides Navy Carrier Strike groups and the Joint force with the capabilities to achieve Electromagnetic Spectrum superiority. NGJ will maximize the survivability and lethality of the Navy's 4th and 5th generation aviation platforms and strike weapons and support all Services and joint/coalition air, land, and sea tactical strike missions.

NGJ will be implemented via three separate programs: Mid-Band (formerly known as Increment 1); Low-Band (formerly known as Increment 2); and High-Band (formerly known as Increment 3). NGJ Mid-Band is currently in the Engineering and Manufacturing Development phase. Despite a delay due to a required pod structure redesign effort to meet air worthiness requirements, a collaborative government/industry effort completed the structure redesign in June 2018, and the program is scheduled to IOC in fiscal year 2022.

Our fiscal year 2020 budget requests \$524.3 million in RDT&E for delivery of Engineering Development Models, developmental flight testing, and procurement of System Demonstration Test Articles. We also request \$111.1 million in RDT&E to complete the NGJ Low-Band 'Demonstration of Existing Technologies' effort and commence a follow-on development contract.

## AIRBORNE EARLY WARNING AIRCRAFT

*Airborne Early Warning Aircraft*

The E-2D Advanced Hawkeye (AHE) is the Navy's carrier-based Airborne Early Warning and Battle Management Command and Control aircraft. The E-2D AHE provides Theater Air and Missile Defense capabilities and is a cornerstone of the Naval Integrated Fire Control system of systems enhancements.

The fiscal year 2020 President's Budget requests \$232.8 million in RDT&E to continue the Navy's modernization priorities, to include, Naval Integrated Fire Control development and test, Theater Combat ID and National Technical Means integration, ALQ-217 Electronic Support Measures and Survivability updates, Cyber Protection, Counter Electronic Attack, Secret Internet Protocol Router chat, Crypto Modernization/ Frequency Remapping, Multifunctional Information Distribution System/Joint Tactical Radio System Tactical Targeting Network Technology, Sensor Netting, and Data Fusion.

In the second year of what will be a 24 aircraft MYP contract covering fiscal years 2019–2023, the fiscal year 2020 budget also requests \$934.7 million in APN for four Full Rate Production (FRP) Lot 8 aircraft and Advance Procurement for fiscal year 2021 FRP Lot 9 aircraft.

#### ASSAULT SUPPORT AND LOGISTICS SUPPORT AIRCRAFT

##### *Tilt-Rotor Aircraft (USMC MV-22 Osprey and Navy CMV-22B)*

The fiscal year 2020 President's budget for the DON V-22 program (MV-22 and CMV-22) requests \$185.1 million in RDT&E, \$993.8 million in APN for procurement of aircraft, and \$325.4 million in APN for modification of aircraft.

Marine Corps MV-22 Ospreys currently have a permanent presence in INDOPACOM, CENTCOM, and EUCOM supporting crisis response missions for AFRICOM. At any point, there are no less than five MV-22 squadrons deployed. Marine Corps is planning to procure an additional 16 aircraft through a five-year multi-year procurement package (FY2018–FY2022). The MV-22 readiness program, comprised of Common Configuration-Readiness and Modernization (CC-RAM) and nacelle improvements, is the MV-22 community's optimized plan to increase mission capable rates by 15 percent. The fiscal year 2020 budget requests \$115.6 million in RDT&E for continued MV-22B development and product improvements, \$8.5 million to support advance procurement requirements and \$315.3 million for modifications, of which \$140.2 million is reserved for CC-RAM and \$33M for nacelle improvements.

The Navy is continuing development of Carrier On-board Delivery (COD) mission aircraft. The COD replacement program is leveraging prior Department MV-22 investment to recapitalize the legacy C-2 Greyhound fleet with CMV-22B tilt-rotor aircraft. Navy's CMV-22B aircraft require modifications to the baseline MV-22 design to better suit this platform for carrier operations. Those modifications include, greater fuel capacity in the fuselage and wings to allow the aircraft to carry up to 6,000 pounds for a distance of at least 1,150 nautical miles, beyond line-of-sight high frequency radio, public address system, improved fuel jettison system, improved cargo lighting system and integration of Operations and Safety Improvement Program (OSIP) capabilities. The FY20 President's Budget requests \$69.5 million in RDT&E for continued CMV-22B development, testing and product improvements; \$985.3 million in APN for procurement of 10 Lot 24 CMV-22Bs and long-lead materials for fiscal year 2021 (Lot 25) aircraft; and \$10.1 million for readiness and interoperability OSIPs.

##### *C-2A Greyhound*

As the DON recapitalizes the long-range aerial logistics support and COD capabilities with CMV-22B, the C-2A fleet will continue to provide critical COD support for operations worldwide until the fiscal year 2024 timeframe. The fiscal year 2020 budget request provides for \$15.8 million in APN and \$1.5 million in RDT&E to manage remaining C-2A aircraft mission systems obsolescence, including critical Center Wing Section repair kits to maintain sufficient capacity and readiness to safely complete the transition to CMV-22B.

##### *CH-53K Heavy Lift Replacement Program*

The fiscal year 2020 President's Budget requests \$516.7 million in RDT&E to continue the CH-53K Engineering Manufacturing Development phase and \$1.0 billion in APN for procurement of six Lot 4 LRIP aircraft, including Advance Procurement and initial spares.

The need for a heavy lift replacement aircraft remains vital to supporting the Marine Corps in present and future warfighting concepts. In spite of the recent setbacks associated with the program's development—rate of closure in technical deficiencies—all of the technical deficiencies are solvable issues. To date, the CH-53K has flown more than 1,370 flight hours towards the completion of the program. It has also demonstrated the lifting of 36,000 lbs and operational gear like the Joint Light Tactical Vehicle. During fiscal year 2020, the program will continue to execute developmental test flights including propulsion qualification, initial shipboard qualification, aerial refueling, hot/high altitude testing, structural loads demonstration, window/ramp guns testing and fire extinguishing system development.

##### *CH/MH-53E*

To keep the CH-53E and MH-53E viable through their remaining services lives, the fiscal year 2020 President's Budget requests \$68.4 million (\$11.4 million MH-53E and \$57.0 million CH-53E) in APN and \$16.5 million (\$0.8 million MH-53E and \$15.6 million CH-53E) in RDT&E. The funding will provide for Condition Based Maintenance software upgrades, cockpit upgrades, Embedded Global Posi-

tioning System/Inertial Navigation System, T-64 engine reliability improvements, survivability upgrades, and Phase I of CH-53E's Degraded Visual Environment capability. These critical safety and avionics upgrades are essential to address obsolescence issues within the cockpit, increase overall situational awareness, and maintain mission effectiveness.

Maintenance on both variants of the H-53E becomes more challenging as they approach 30 years of service. Unprecedented operational demand of the CH-53E significantly impacted the material condition of DoD's only heavy lift assault support aircraft. This challenge has been significantly mitigated with the introduction and continued execution of the H-53 reset initiative. The purpose of reset is to return fully mission capable aircraft with zero discrepancies to the fleet and recover readiness. To date, 24 aircraft have completed reset and accumulated over 9,200 flight hours. Reset has also reduced both the cost per flight hour and maintenance man hours per flight hour. Continued reset and sustainment initiatives are critical to the success of the CH-53E until its replacement, the CH-53K, is delivered to the fleet. The MH-53E will continue to perform its primary mission of airborne Mine Countermeasures as well as transport of cargo and personnel until it is replaced by the family of modular systems that comprise the Littoral Combat Ship (LCS) Mine Countermeasures Mission Package.

#### ATTACK AND UTILITY AIRCRAFT

##### *AH-1Z/UH-1Y*

The fiscal year 2020 President's Budget requests \$114.1 million in APN and \$65.4 million in RDT&E for aircraft modernization efforts that will significantly increase relevance, safety, and lethality on the modern battlefield. The H-1 Upgrade Program completed procurement in fiscal year 2019. Over a decade has passed since the initial fielding of the Venom and Viper. The fleet has significant obsolescence issues in software architecture, Aircraft Survivability Equipment (ASE), navigation equipment, Health and Usage Monitoring Systems, and weapons systems.

Previously funded hardware retrofits are currently underway for mission computers, ASE, and DI. Drivetrain and air vehicle improvements have improved reliability. The H-1 fleet is leveraging concurrent DI and weapons upgrade efforts across the Aviation Enterprise to provide initial LINK-16 and Joint Air-to-Ground Missile capabilities in fiscal year 2020 and 2021 respectively. Additional efforts include EGI upgrade, Aircraft Network Switch, and Advanced Data Transfer System. Integrating and enabling the full capabilities of these systems requires an investment in software modernization and Ethernet backbone. The Marine Corps will seek future funding in support of these initiatives to secure battlefield relevance, lethality, survivability, and operational safety.

##### *MH-60R/S*

The fiscal year 2020 President's Budget requests \$149.8 million in APN and \$19.2 million in RDT&E. APN funds support safety related systems improvements, corrections of deficiencies, warfighter upgrades, and obsolescence issues such as mission-computer modernization and procurement of kits for the Helmet Display Targeting System, Advanced Data Transfer System, Data Link, and VOR/ILS. RDT&E funding is requested to support developmental efforts that include MH-60S Service Life Assessment Program, Multifunctional Information Distribution System Block Upgrade 2 and implementation of Link-16 J11 and J12.6 series messages that will enable the helicopter to provide in-flight target updates to Net Enabled Weapons.

#### EXECUTIVE SUPPORT AIRCRAFT

##### *VH-3D/VH-60N Executive Helicopter Series*

The fiscal year 2020 President's Budget requests \$8.9 million of APN to continue programs that ensure the in-service Presidential fleet remains safe, reliable and current. Ongoing efforts include a Communications Suite Upgrade (Wide Band Line of Sight) that provides persistent access to the strategic communications network, the continuing Structural Enhancement Program necessary to extend platform service life, and Obsolescence Management needed to sustain and improve system readiness for both VH-60N and VH-3D platforms. The Cabin Interior and Environmental Control System upgrade is a critical obsolescence management effort for the VH-3D, reducing aircraft operational weight and improving maintainability. Where appropriate, technology updates for legacy platforms will be directly leveraged for the benefit of the VH-92A program.

*VH-92A Presidential Helicopter Replacement Aircraft*

The fiscal year 2020 President's Budget requests \$187.4 million in RDT&E to continue Engineering, Manufacturing and Development activities, to include, contractor tests for airworthiness certification and modifications of Engineering Development Model and System Demonstration Test Article aircraft to support Initial Operational Test and Evaluation. Additionally, \$658.1 million of APN is requested to procure six LRIP Lot 2 aircraft and associated support.

## FIXED-WING AIRCRAFT

*KC-130J (USMC)*

The fiscal year 2020 President's Budget requests \$307.0 million to procure three KC-130Js and spares as part of the fiscal year 2019 MYP (MYP III) and \$96.9 million in APN for targeted improvements. Key improvements include increased survivability through advanced electronic countermeasure modernization, upgrade to the Block 8.1 software that incorporates vital Link-16 digital interoperability, and obsolescence upgrades to the Harvest HAWK Intelligence, Surveillance and Reconnaissance/Weapon Mission Kit. The obsolescence upgrade includes compatibility with additional Hellfire variants and an improved full motion video data-link. Today, the KC-130J remains in high demand, providing tactical air-to-air refueling, assault support, Close Air Support, and Multi-sensor Imagery Reconnaissance capabilities in support of Special Purpose Marine Air-Ground Task Forces (MAGTF) and deployed Marine Expeditionary Units.

## MARITIME PATROL AIRCRAFT

*Maritime Patrol Aircraft*

The P-8A PoseiDON combines the proven reliability of commercial 737 airframes with modern avionics, robust military communications, and advanced sensors and weapons to provide a range of advanced warfighting capabilities. P-8A warfighting capabilities include full-spectrum, wide area, cue-to-kill Anti-Submarine Warfare; armed Anti-Surface Warfare (ASuW); and networked Intelligence, Surveillance, and Reconnaissance (ISR). Continued congressional support of the P-8A program enables the planned divestiture of the aging P-3C Orion aircraft fleet.

The fiscal year 2020 request includes \$1.2 billion in APN for six new aircraft. It also includes \$198.7 million in RDT&E for development of aircraft updates to include the addition of Networked Enabled Weapons capabilities, satellite communication updates, track management enhancements, and sensor fusion capabilities.

*P-3C Orion*

The active duty fleet will finish its transition to the P-8A airframe in fiscal year 2020. Only the Reserve Force (VP-62 and VP-69) will fly the P-3C in the Littoral Surveillance and RADAR System configuration, augmenting the Active Duty Forces in this Maritime ISR mission set through 2022. The Navy plans to recapitalize the reserve Maritime Patrol Force into the P-8A airframe as resources permit.

*EP-3 Arias*

The EP-3E Arias is the Navy's only manned Maritime ISR and Signals Intelligence (SIGINT) platform. The Joint Airborne SIGINT Common Configuration includes Multi-INT sensors, robust communication, and data links employed by the EP-3E air vehicle to ensure effective fleet support across the full spectrum of military operations.

The fiscal year 2011 National Defense Authorization Act directed the Navy to sustain the EP-3E airframe and associated mission systems to minimize SIGINT capability gaps until the systems are fully recapitalized within a system or family of systems that in aggregate provide equal or better capability and capacity. The Navy's family of systems approach to ISR shifts the focus from platforms to payloads to deliver increased capacity and persistence by the end of this decade. To support these efforts, we request \$8.7 million for the EP-3 program as we transition Navy's maritime ISR platforms.

## UNMANNED AIRCRAFT SYSTEMS (UAS)

The DON has placed a priority on the development of unmanned systems leading to a fully integrated manned and unmanned fleet. Unmanned technology will not replace our Sailors and Marines; instead it will unlock their full potential as the Navy integrates this technology within our total force.

*MQ-4C Triton*

The MQ-4C is a critical capability and capacity enabler in the Navy's Maritime ISR&T transition plan. Under this initiative, Triton fills a vital role for the Joint Forces Maritime Component Commander by delivering persistent and netted maritime ISR and furthers our plan to retire legacy EP-3E aircraft as MQ-4Cs are delivered to the Fleet. fiscal year 2020 investments are aligned to deliver air vehicles and control station capacity to achieve IOC in fiscal year 2021, continue our efforts to deliver five full Triton orbits to meet increasing warfighter ISR demands, and enhance MQ-4C capabilities.

The fiscal year 2020 President's Budget requests \$11.8 million in RDT&E to continue Triton baseline development activities; \$202.3 million in RDT&E for Multi-INT modernization; and \$493.3 million in APN for procurement of Lot 5 LRIP aircraft/spares, retrofit of the LRIP Lot 1 and Lot 2 aircraft to the Multi-INT configuration, and procurement of long-lead materials for Lot 6 LRIP aircraft.

*MQ-25 Stingray*

The Navy is fully committed to unmanned carrier aviation. Reflecting this commitment, MQ-25 has been designated a Maritime Accelerated Acquisition Program with a requirement to deliver the Navy's first carrier-based UAS no later than 2024. MQ-25's primary mission is a carrier-based tanker to extend the range, reach, and lethality of the CVW; its secondary mission is as an ISR platform. MQ-25 tanker aircraft will reduce the use of F/A-18E/Fs for recovery and mission tanking, freeing these tactical aircraft to execute their primary strike fighter mission role and increasing strike fighter capacity within the CVW. A key MQ-25 enabler for CVW operations is the Unmanned Carrier Aviation Mission Control Station (UMCS) and its associated infrastructure.

The fiscal year 2020 President's Budget requests \$671.3 million in RDT&E to procure 42 engineering development aircraft under a fixed cost contract and to continue development of the MQ-25 air system and \$32.7 million in OPN for installation of UMCS aboard CVNs.

*MQ-8 Fire Scout*

The MQ-8 Fire Scout is a rotary-wing system that includes two airframe types, the MQ-8B and MQ-8C. The MQ-8C is an endurance upgrade to the MQ-8B. It is a larger, more capable and more cost-effective airframe that uses the same mission-control system, avionics, and payloads as the MQ-8B. Both systems are employed from suitably equipped air-capable ships, carry modular mission payloads, and operate using the Tactical Control System (TCS) and Line-Of-Sight Tactical Common Data Link.

The fiscal year 2020 President's Budget requests \$29.6 million of RDT&E to continue hardware and software modifications, payload integration, cyber vulnerability closure, and safety improvements. The budget also requests \$79.6 million in APN to procure Active Electronically Scanned Array radar kits, ancillary shipboard equipment, aircraft support equipment, trainers and logistics elements to outfit suitable-equipped air-capable ships and train MQ-8 aviation detachments.

*Tactical Control System (TCS)*

The fiscal year 2020 President's Budget requests \$9.5 million in RDT&E for the MQ-8 System's TCS. TCS is a government-owned, standards-compliant software suite that provides scalable command and control capabilities for the MQ-8 Fire Scout system. In fiscal year 2020, we will continue to enhance and sustain TCS software integration enabling MQ-8 operations on air capable ships to include LCS, Frigate (FFG(X)), and the Expeditionary Sea Base (ESB). We will also continue integration and test focused on the MQ-8C radar and Minotaur mission management system and migration to the Common Control System (CCS).

*RQ-21A Blackjack*

To meet the demand for persistent, multi-role ISR capability, the Department is building a balanced portfolio of manned and unmanned aircraft focused on expeditionary maritime environment missions. RQ-21 Blackjack, a Group 3 unmanned air system with the capability for runway independent operations aboard amphibious ships and on the shore, provides persistent ship and land based ISR support for Marine Expeditionary and Naval Special Warfare tactical-level maneuver decisions, unit-level force defense, and force protection missions. The RQ-21 UAS has completed several successful combat deployments and has proven itself to be significant contributor to the warfighter.

The fiscal year 2020 President's Budget requests \$22.4 million in RDT&E (\$11.5 million USN, \$10.9 million USMC) and \$118.0 million in APN for support of Marine

Corps and Naval Special Warfare forces to address ISR capability requirements (\$98.2 million USN, \$19.8 million USMC).

*MAGTF Expeditionary UAS (MUX)*

The MAGTF Expeditionary UAS (MUX) will provide a competitive advantage to naval expeditionary forces operating in contested maritime spaces. MUX is currently envisioned to be a weaponized, payload-flexible, shipboard capable and expeditionary system that is runway-independent for all weather conditions. The system will also provide a multi-mission, long-range (690+ NM), long-endurance (24+ hours), platform that will complement MV-22 operations and operate from the sea in an uncontested environment. MUX will facilitate sea denial operations and maritime maneuver globally in support of our fleet commanders. The fiscal year 2020 President's Budget requests \$21.2 million for research and development requirements.

*Common Control System (CCS)*

The fiscal year 2020 President's Budget requests \$43.1 million in RDT&E and Other Procurement Navy (OPN) for continuation of CCS activities. The primary mission of CCS is to provide common control across the Navy's unmanned systems (UxS) portfolio to add scalable and adaptable warfighting capability, implement robust cybersecurity attributes, leverage existing government owned products, eliminate redundant software development efforts, consolidate product support, encourage innovation, improve cost control, and enable rapid integration of UxS capabilities across all domains (air, surface, sub-surface, and ground). CCS leverages existing government owned software to provide UxS Vehicle Management (VM), Mission Management (MM) and Mission Planning (MP) capabilities. CCS delivered initial UxS VM functionality for MQ-25 Stingray in fiscal year 2018. CCS VM functionality was delivered to MQ-8 Fire Scout in early fiscal year 2019 with another delivery scheduled for the third quarter of fiscal year 2019. In fiscal year 2020, CCS will continue development of common mission management/mission planning capabilities, common software service development, and support, including the continued refinement of incremental common service releases for MQ-25 Stingray and MQ-8 Fire Scout which will support other future UxS platforms transitioning to CCS.

STRIKE WEAPONS PROGRAMS

*Offensive Missile Strategy (former 'Cruise Missile Strategy')*

The Department previously developed and submitted a 'Cruise Missile Strategy' to Congress. This strategy delineated our plans for supporting all cruise missile weapon systems such as Tomahawk, the Long-Range Anti-Ship Missile (LRASM), Harpoon, etc. and the development of future next generation weapons. Navy offensive strike systems, however, consist of a broader family of current and future weapons. These weapons capitalize on key system attributes (e.g. speed, range, lethality, survivability, commonality) with a strong focus on delivering 'multi-domain' capabilities. Under this construct, 'Cruise Missiles' are a subset within the offensive strike weapons family. As a result, the DON has broadened the scope of the 'Cruise Missile Strategy' to include all non-nuclear offensive strike missiles with ranges greater than 50 nautical miles (i.e. the 'Offensive Missile Strategy' (OMS)).

The OMS construct supports a wider, more systematic approach towards delivering a capabilities balance to increase overall force effectiveness to address emerging threats. The DON will evaluate the OMS via an iterative process. We will review existing and developing capabilities, leverage analytical processes/study updates, and assess threat/intelligence report updates to inform annual RDT&E and procurement funding priorities to achieve an optimal mix of offensive strike missile system capabilities.

Our OMS construct has three pillars. First, the Navy will sustain relevant weapon systems. Our objective is to preserve the readiness and capacity of our key strike weapons inventories. Second, we will pursue strike weapon capability enhancements. Under this initiative, we will develop near-term capability upgrades to enhance existing weapons that provide critical improvements to our current long-range strike weapons capabilities (e.g. Maritime Strike Tomahawk, new Tomahawk warhead (Joint Multiple Effects Warhead System), LRASM V1.1, SM-6/Block 1B, and the Naval Strike Missile). Third, we will develop next generation strike missile capabilities to address emerging threats.

To fully inform Congress of next generation weapons development plans, we have completed classified briefings to all four Defense Committees.

*Tomahawk Cruise Missile*

The fiscal year 2020 President's Budget requests \$320.1 million in RDT&E, \$386.7 million in Weapons Procurement Navy (WPN) and \$78.6 million in OPN.

RDT&E will be used for development and test of: navigation and communications upgrades to improve performance in Anti-Access/Area Denial environments; a Maritime Strike Tomahawk (MST) variant; a Global Positioning System M-Code capability; the Joint Multiple Effects Warhead System and Fuse; and the associated Tactical Tomahawk Weapon Control System (TTWCS) and Tomahawk Mission Planning Center (TMPC) updates that support all upgrades and address usability, interoperability and information assurance mandates.

WPN is required for the restart of the Tomahawk missile production line and procurement of 90 all-up-round missiles, procurement of 156 Navigation/ Communications kits, procurement of 20 MST kits and completion of 112 missile recertifications.

OPN is required for procurement and installation of TMPC and TTWCS hardware/software modifications to address evolving security requirements, critical program information protection, obsolescence updates, and modern computing architecture improvements.

*Next Generation Land Attack Weapon (NGLAW)*

NGLAW will provide the next generation of long-range, kinetic strike capability to destroy high-priority fixed, stationary and moving targets—as well as those targets hardened, defended or positioned at ranges such that engagement by aviation assets would incur unacceptable risk. NGLAW will be capable of kinetic land and maritime attack from both surface and sub-surface platforms. The NGLAW AoA has completed and the classified results have been shared with all four congressional defense committees.

*Offensive Anti-Surface Warfare (OASuW) Increment 1 (Long Range Anti-Ship Missile (LRASM))*

OASuW Increment 1 (LRASM) will provide Combatant Commander's the ability to conduct ASuW operations against near/mid-term high-value surface combatants protected by Integrated Air Defense Systems with long-range Surface-to-Air-Missiles and deny adversaries sanctuary of maneuver. The program achieved Early Operational Capability (EOC) on the Air Force B-1B in early fiscal year 2019 and is on-track to achieve EOC on the Navy's F/A-18E/F aircraft prior to the schedule objective of the fourth quarter of fiscal year 2019.

The fiscal year 2020 President's Budget request \$65.4 million in RDT&E for LRASM V1.1 development and testing and \$143.2 million in WPN to purchase LRASM All-Up-Round weapons.

*Offensive Anti-Surface Warfare (OASuW) Increment 2*

OASuW Increment 2 is required to deliver the long-term, air-launched ASuW capabilities to counter 2028 threats (and beyond). The Department continues to plan for OASuW Increment 2 to be developed via full and open competition. To inform the long-term path forward, the DON will leverage NGLAW AoA results to inform the required ASuW capabilities. The AoA study to determine the Increment 2 path-forward will complete in 2019. In the interim, Navy is pursuing incremental upgrades to LRASM to bridge the gap until an OASuW Increment 2 program of record can be established. Increment 2 IOC is now planned for the fiscal year 2028–2030 timeframe.

*Sidewinder Air-Intercept Missile (AIM-9X)*

The fiscal year 2020 President's Budget requests \$19.5 million in RDT&E and \$119.5 million in WPN for AIM-9X. RDT&E will be applied toward the Engineering Manufacturing Development of critical hardware redesign driven by obsolescence; developmental test of System Improvement Program missile software (Version 9.4); and design and development of Insensitive Munitions improvements. WPN funding is requested to procure a combined 292 All-Up-Rounds and Captive Air Training Missiles and associated missile/trainer related hardware.

*Advanced Medium-Range Air-to-Air Missile (AMRAAM/AIM-120D)*

The fiscal year 2020 President's Budget requests \$39 million in RDT&E for continued software capability enhancements and \$224.5 million in WPN for 169 All-Up-Rounds and associated missile-related hardware. RDT&E resources support the development and test of an Electronic Protection Improvement Program and a System Improvement Program to counter emerging electronic attack threats.

*Small Diameter Bomb II (SDB II)*

The fiscal year 2020 President's Budget requests \$50.1 million in RDT&E for continued development/test of the SDB II weapon, F/A-18E/F Operational Testing, and F-35 Developmental Testing. The DON also requests \$118.5M in WPN to procure 750 All-Up-Round weapons.

*Advanced Anti-Radiation Guided Missile (AARGM) & AARGM Extended-Range*

The fiscal year 2020 President's Budget requests \$7.1 million of RDT&E for Anti-Radiation Missile Foreign Material Assessment; \$11.7 million for AARGM Advanced Development, FOT&E Correction of Deficiencies, and System Capability Upgrades; and \$119.6 million for AARGM Extended Range (AARGM-ER) development. The Department also requests \$183.7 million in WPN for production of 245 baseline AARGM Block 1 modification kits for integration into All-Up-Rounds.

*Harpoon II+*

The fiscal year 2020 President's Budget requests \$25.4 million in WPN to procure 70 modification kits and 9 Captive Training Missiles. Harpoon II+ will integrate an upgrade package to the existing USN Block 1C missiles and System Configuration Set for the F/A-18 E/F and P-8 aircraft.

*Joint Air-to-Ground Missile (JAGM)*

The fiscal year 2020 President's Budget requests \$18.4 million in RDT&E for software development, AH-1Z platform integration, modeling and simulation, and completion of Developmental Testing, and Integration Testing. Additional efforts include Operational Testing in support of the FRP Decision and fiscal year 2020 IOC on the AH-1Z. The budget request also includes \$91.0 million in WPN to procure 382 tactical missiles and four captive air training missiles.

*Advanced Precision Kill Weapon System II (APKWS II)*

APKWS II has become a weapon of choice in current operations due to its high stowed "kills" capacity, exceptional accuracy and reliability, and low-yield warhead that reduces the risk of collateral damage while achieving the desired effect on the target. The fiscal year 2020 President's Budget requests \$31.5 million in PANMC for procurement of 1,123 APKWS II guidance section kits for use on both rotary-wing and fixed-wing platforms.

*Direct Attack Weapons and General Purpose Bombs*

Fully funding the General Purpose Bombs and Joint Direct Attack Munition (JDAM) line items are critical to building and maintaining the DON's direct attack weapons inventory. The fiscal year 2020 President's Budget requests \$63.0 million for Direct Attack Weapons and General Purpose Bombs and an additional \$82.7 million to procure 3,388 JDAM kits to enhance readiness and prepare for future contingencies.

## CONCLUSION

Naval Aviation operates forward—near our potential adversary's home shores. With an increasingly complex national security environment and overt challenges to the current international order, we need Congressional support to deliver the ready, capable, and global sea-based and expeditionary force to meet these challenges. Our vision is to provide the right capability in the hands of the warfighter, on schedule, and in the most affordable manner possible. With the support of Congress, we will build and sustain a lethal, resilient force through balanced investments across readiness and capability and rebuild the capacity we lost over the past decade.

**Addendum A**

## SAFETY

## (PART 1 OF 2)

All Navy senior leadership views the occurrence of Physiological Episodes (PE) in our tactical aircraft and trainers with the highest concern and it remains our number one aviation safety priority. To date, we have identified multiple interrelated causal factors. The mitigation efforts currently in place, include software modifications, personnel education, and equipment changes are positively affecting the PE rate for all Type/Model/Series aircraft but most notably in T-45s. With these mitigations, Naval Aviation is currently meeting operational requirements and personnel are working in an operationally safe environment.

For our T-45 aircraft we have reduced the overall PE rate substantially with more than 100,000 flight hours flown and only 14 events since return to flight (where in prior years' rates had been as high as 80 events/100,000 flight hours). Two of the 14 are still under investigation for final determination as to whether or not they meet the criteria necessary to be deemed a PE. Seven of the 14 cases post return-to-flight were attributed to human factors; in all T-45 cases, negligible contaminants were found in the monitoring devices, all well below Occupational Safety and Health Administration standards, and contamination has been ruled out as a causal factor in T-45 PE. Beyond mitigating the identified flow problem from the engine, we are integrating an Automatic Backup Oxygen System (ABOS) to improve oxygen generating system performance overall.

In our F/A-18 aircraft, we continue to implement changes that are improving the Environmental Control System, increasing system reliability and improving the cockpit environment for our aviators. In Legacy aircraft (F/A-18 A-D) we have seen an almost fifty percent reduction in PE rates, largely due to implementation of AFB (Air Frame Bulletin) 821 in 2017. AFB-821 which places life limits on seven ECS high-time components with the purpose of inspecting and replacing components as necessary to improve and baseline system operation. Furthermore, the F/A-18 Root Cause Corrective Action team has identified premature component failure as a contributory factor in almost 300 PEs. All of those components are under re-design, and two will be begin to be implemented in the Fleet in 4Q fiscal year 2019. More work remains to be DONE, but mitigation and redesign efforts are producing positive results in all FA-18 variants but not to the levels we seek. We are collaborating across the DoD to leverage research efforts to help characterize the cockpit environment to ensure we reach long-range, holistic solutions. We are investigating every line of inquiry recommended by NASA to include measuring breathing gas quality at the mask. We are working with our industry partners to develop a new On Board Oxygen Generating System concentrator designed to replace the existing concentrator currently in the F/A-18 and EA-18 aircraft. This effort will provide digital data logging of performance, increased reliability and oxygen scheduling in compliance with the recently published MIL-STD 3050.

We continue to provide Flag-level leadership and oversight to this critical effort. RDML Luchtman heads the Physiological Episode Action Team and unifies all PE actions supporting multiple aircraft across Naval Aviation. Our engineers, industry partners, physiologists and outside support will continue to work diligently to drive PE to the lowest possible level.

#### SAFETY

(PART 2 OF 2)

##### *Class A, B, and C Aviation-Related Safety Issues Summary*

A summary of all Naval Aviation Class A, B and C aviation-related safety issues, including recent mishaps, trends, and analysis from October 2016 through March 2019 follows. The rates presented in the table are based on total mishaps per 100,000 flight hours and include Flight, Flight-Related and Ground mishaps.

Year	Flight Hours	Class A	Class A Rate	Class B	Class B Rate	Class C	Class C Rate
Fiscal year 2017	1,072,156	25	2.33	35	3.26	239	22.29
Fiscal year 2018	1,072,229	19	1.77	40	3.73	249	23.22

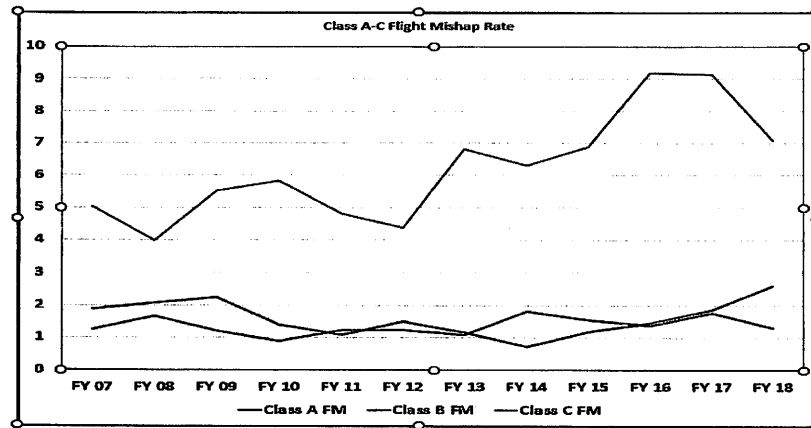
The most recent (fiscal year 2017-13 Mar 2019) DON flight Class A mishaps include:

- 28 February 2019: (MCAS Miramar, CA) Two F/A-18C's collided in mid-air while conducting CAS. Both aircraft landed safely. No injuries.
- 05 December 2018: (Philippine Sea) F/A-18D and KC-130J collided while performing fixed wing aerial refueling mission. F/A-18 aircrew ejected with one fatality. 5 aircrew fatalities in the KC-130.
- 12 November 2018: (Philippine Sea) F/A-18F aircraft malfunction resulting in loss of aircraft; aircrew recovered and in stable condition.
- 18 October 2018: (Pacific Ocean) MH-60R crashed on takeoff onboard CVN.
- 04 October 2018: (NAS Lemoore, CA) A right engine fire occurred on a F/A-18F during a training flight. Emergency landing with no injuries.
- 28 September 2018: (Beaufort MCAS, SC) F-35B crashed. Pilot ejected safely.
- 21 August 2018: (VACAPES) F-35C ingested FOD while conducting aerial refueling operations with an F/A-18F. Both aircraft were damaged.
- 16 August 2018: (Near Mountain Home AF Base, Idaho) Aircraft suffered hard landing in FARP prior to refueling operations. No Injuries or casualties.

- 02 August 2018: (Lavic Lake, CA) UH-1Y skid and main rotor blades damaged during Low Light Level RVL landing.
- 07 June 2018: (Western Pacific near Guam) FA-18E experienced fire indications and engine failure immediately after catapult launch. Aircraft recovered safely on single engine.
- 13 April 2018: (Iwakuni, JP) FA-18E experienced Class A mishap in flight. Aircraft recovered safely.
- 03 April 2018: (El Centro, CA) CH-53E impacted ground while on approach into a landing zone. 4 fatalities.
- 02 April 2018: (Djibouti Ambouli International) AV-8B shortly after lift-off impacted ground, pilot ejected safely. 14 Mar 2018: (Key West, FL) F/A-18F while flying single engine, crashed on short final. 2 fatalities.
- 14 March 2018: (Key West, FL) F/A-18F while flying single engine, crashed on short final. 2 fatalities.
- 11 December 2017: (Tinker AFB, OK) E-6B struck birds during descent, leading to number 4 engine flameout.
- 04 December 2017: (NAS Fallon) F/A-18A right leading edge flap departed aircraft in flight and hit the vertical stabilizer.
- 22 November 2017: (Philippine Sea) C-2A ditched while inbound to CVN with 11 onboard. 3 fatalities.
- 11 October 2017: (Futenma MCAS, Japan) CH-53E engine fire in flight, emergency landing. No injuries.
- 01 October 2017: (Monroe County, TN) T-45C crashed on low-level training route. 2 fatalities.
- 28 September 2017: (Syria) MV-22B crashed on landing during support mission.
- 12 August 2017: (Bahrain) F/A-18E departed runway during landing after a ship to shore divert due to an engine malfunction. Pilot ejected. No injuries.
- 09 August 2017: (25 Miles South of Key West, FL) F-5N went down over water. Pilot ejected safely.
- 05 August 2017: (15 nm off NE Australia IVO Shoal Water Bay) MV-22B struck LPD flight deck on final approach and then crashed into water. Three personnel are missing and presumed deceased. 23 recovered.
- 05 August 2017: (North Island NAS, CA) F/A-18F struck round down with right horizontal stabilator upon landing. Diverted successfully.
- 16 July 2017: (Bay of Bengal) F/A-18F engine borescope plug backed out in flight causing hot air to burn to engine bay and aircraft skin.
- 10 July 2017: (Indianola, MS) KC-130T crashed on logistics flight from Cherry Point to El Centro. 16 fatalities.
- 26 April 2017: (Off the Coast of Guam) MH-60R collided with water on initial takeoff from ship. No injuries.
- 21 April 2017: (Philippine Sea) F/A-18E lost on approach to landing on carrier. Pilot ejected without injury prior to water impact.
- 05 April 2017: (Yuma, AZ) CH-53E landed hard and rolled on day training flight. Crew of five uninjured.
- 28 March 2017: (El Centro NAF) HH-60H main rotor blades contacted tail rotor driveshaft on landing.
- 17 January 2017: (NAS Meridian, MS) T-45 crashed following a BASH incident on takeoff. Both crewmembers ejected. No fatalities.
- 13 December 2016: (Off the Coast of Okinawa, Japan) MV-22B attempted a precautionary emergency landing (PEL) to dry land but crash landed in shallow water. Crew of five evacuated with injuries.
- 07 December 2016: (Off the Coast of Iwakuni MCAS, Japan) F/A-18C crashed into the water while conducting a night mission. One fatality.
- 21 November 2016: (Upper Mojave Desert Region) F/A-18F struck a tree while instructor pilot was conducting a currency flight event. Returned to base safely. No injuries.
- 09 November 2016: (Off the Coast of San Diego) Two F/A-18As were conducting basic flight maneuvers and had a mid-air collision. One aircraft crashed in the water. Pilot ejected successfully. One aircraft landed with significant damage.
- 27 October 2016: (MCAS Beaufort, SC) F-35B had an inflight weapons bay fire followed by an uneventful landing. No injuries.
- 25 October 2016: (Twenty-nine Palms, CA) F/A-18C crashed on final approach. Pilot ejected successfully. No injuries.
- 20 October 2016: (Yuma, AZ) CH-53E main rotor contacted building causing damage to the aircraft.

DON Class A aviation ground and Flight Related mishaps (AGM and FRM):

- 07 February 2019: (Tinker AFB, OK) E-6B being towed out of a hangar when vertical stabilizer struck the hangar. (AGM)
- 09 December 2018: (MCAS New River, NC) CH-53E landing gear inadvertently retracted during ground taxi. (AGM)
- 09 October 2018: (Kadena AFB, Japan) Two HH-60H helicopters taxied into each other on the taxi ramp. No injuries. (AGM)
- 30 July 2018: (NAS North Island, CA) During hotseat, HH-60H auxiliary fuel tank detached from aircraft and landed on two servicemembers. E-6 died in the hospital, E-5 was treated and released. (AGM)
- 18 July 2018: (SOCAL) Sonar Transducer Assembly (TA) departed MH-60R during anti-submarine warfare (ASW) training. (FRM)
- 16 May 2018: (Andros Island, Bahamas) MH-60R lost a dipping sonar while conducting sonar operations. (FRM)
- 17 September 2018: (Atlantic Ocean) E-3 killed when struck by E-2C propeller on deck of CVN. (AGM)
- 21 February 2018: (MCAS Camp Pendleton, CA) O-3 died on 24 Feb from injuries sustained when he was struck by a UH-1Y tail rotor. (AGM)
- 17 August 2017: (NW of San Clemente Island) MH-60R lost SONAR transducer at sea. (FRM)
- 11 July 2017: (New River MCAS, NC) Maintenance personnel struck by lightning on the flight line while working on MV-22B. One fatality. Two others were treated and released.
- 25 June 2017: (MCAS Miramar, CA) Two Marines injured and F/A-18A damaged after flammable material in drip pan caught fire. (AGM)
- 19 January 2017: (NAS Norfolk, VA) Three E-2C aircraft damaged in an engine oil related event. (AGM)
- 18 December 2016: (Kadena AFB, Japan) Tow bar separation resulted in aircraft/tow collision with damage to nose gear and lower fuselage of P-8A. (AGM)
- 16 December 2016: (NAS Whidbey Island, WA) Canopy on EA-18G exploded/jettisoned resulting in severe injuries to two personnel. (AGM)



DoN Historical Mishap Rate Trend per 100K Flight Hours per Mishap Class

Senator PERDUE. Thank you, sir.

I will be very brief. We are going to have 5-minute rounds, and we will get started now.

You know, I would like to open up with the financial side of this conversation before we get into the equipment and the other parts. You mentioned in the last 2 years, we have had no CRs, continuing resolutions, and an on-time appropriation last year. 187 times in the last 45 years since the 1974 Budget Act was put into place, Congress has used a continuing resolution.

I have been exploring this for a couple years, and I was on the Harry S. Truman Monday of this week. I asked specific questions

of operating people. I have talked to marines in Maron, Spain. I have talked to marines in Australia, everywhere I go, Air Force people in Alaska. Anybody that will sit still and listen to me, I want them to tell us how the CRs affect your fighting capability and the people on the ground, the morale, and the realities of funding maintenance and procurement. That is open for the air guys, the ground guys.

Secretary, do you want to start that? But I would love to get your thoughts and specific examples of how this really affects the military in your area of command.

Secretary GEURTS. Absolutely, sir. And thank you for your interest in recognizing the impacts.

I will outline, I would say, it at the macro level in big numbers that have B's alongside of them, which is important. And then I would ask my teammates here to kind of give it more at the deck plate level and what does it mean all the way down to the unit level. And I think both of them are critically important.

To the Navy, we see a \$20.4 billion impact if we go to a CR for the full year next year. Of that, about \$5.2 billion would be new start programs that we could not execute. About \$5.3 billion would be production rate increases that we have budgeted that we cannot execute, and about \$9.9 billion of that are for funds where we have programs that are growing or need that funding and will be capped at their current level.

So that is \$20.4 billion. That is a big number at the macro level, which impacts ships. It impacts aircraft. It impacts ground vehicles. It impacts research and development. It impacts manpower. It impacts us across the board, all our depot maintenance across the board. And it is not just programs. It is people. It is depot workers. It is highly trained workforce that if there is uncertainty, they are going to move to different jobs. And so not only will it be a delay, it will be a multiplier effect because we will not only lose either those workforces in the depots or on the flight lines or in programs, but the chance to recover them will have kind of a lasting multiplier effect.

Senator PERDUE. That is \$24 billion. Your allocation for naval operations—

Secretary GEURTS. \$20.4 billion.

Senator PERDUE. \$20.4 billion. So is that for fiscal year 2020? Correct?

Secretary GEURTS. That is for fiscal year 2020. If we have a CR the entire year, there is \$20.4 billion of effort we are not going to be able to execute based on the way the CR—

Senator PERDUE. So directionally, that is around 10 percent of your naval operating budget this next year. Is that correct?

Secretary GEURTS. Yes, sir. And it is big platforms like the additional submarine we are trying to get underway, an additional destroyer we have planned. It is our helicopter replacement system so we can train pilots for all for our helicopter fleets—that program. It is our new frigate. Based on the testimony yesterday the CNO had, you know, that is a game-changer for us. It impacts across the board at the big program level.

Now, I would like to have the witnesses next to me also describe what does it mean at the human element, kind of at the unit level

and at the deck plate level because impact on programs is important. Probably even more impactful is the morale and the impact at the human level throughout our formation. General Berger, if you would like to add in.

Lieutenant General BERGER. Just a couple thoughts. I think at the Title X service headquarters level, clearly covered. At the unit level where General Rudder and I and the Admiral are probably more comfortable talking about, they already have a plan for the following year long before October comes, which is going to cost money, going to cost money to train, going to cost money to deploy forces that are scheduled to deploy. It costs money to purchase the ammunition. It costs money to move the force to where you want to train. If you are on the east coast and you are going to Twentynine Palms to train, all of that costs money. So you forecasted all that and built a budget based on what you thought you were going to get.

So when you go into a CR at the unit level, the first question for them is they do not know how long. It is for a given period, but their experience is we may have a second one and a third one and a fourth one. So they begin the year without a knowledge of either, A, what the total budget is going to be or, B, how long are we going to be in this CR. So they have all these decision points about when I will buy airlift, when I will start to move equipment based on what they are guessing they might get.

And inevitably what happens is exercises get canceled. Sometimes stuff is moved, but the force cannot get there, so you have wasted money. Or you move past the point where you would buy the airlift and now it is more expensive because if you do it 60 days out it costs one price. If you do it within 30, it is another price.

I am going to ask General Rudder if he has other thoughts.

Lieutenant General RUDDER. That was a great explanation of the deck plate.

And I would offer on top of that is our depots. In the past couple years, we have been able, with the budgets that this committee and both sides have given us, to hire back in the naval FRCs [fleet readiness centers] alone 2,900 artisans, engineers, and logisticians. I think the CR does not necessarily make them go away, but it makes the hiring process and retention process that much more challenging.

So we are now in a place at our depots we think of our depots now like a weapon system. And we have got the right people in place. We are still training many of those because they are new joins even in fiscal year 2018, but we are now producing on-time products that are going directly back into the squadrons and they are flyable products, whereas before, we were delayed, we were struggling. So I would offer just for the support structure itself, CRs with 2 weeks, 3 weeks, 4 weeks start/stop creates a lot of uncertainty in our support structure.

Admiral?

Rear Admiral CONN. There are a number of new starts that I can mention. I think you are aware of some of them. Let me just go to one point.

I had a meeting yesterday with the top gun CO and two lieutenants that are on his staff. And we went over in a classified setting

the pacing threat. We went over what we had planned in 2018, what was budgeted in 2019, what we are requesting in 2020, where we are going in 2021. If we go back to a CR, that stuff gets blown up. And what we are transmitting to those lieutenants is we are not committed to winning.

Senator PERDUE. That is why I asked the question, sir. Great answer. Thank you.

Senator HIRONO?

Senator HIRONO. Thank you very much.

In fact, the Chairman and I have been very focused over the past several months on our continuing use of CRs. And we are in an environment now where I think we have concerns about our readiness posture for all of our services, and I would say that that is one of the biggest negatives of continuing to rely on CRs to keep things going.

Having said that, though, I do not know what the answer is to force Congress not to resort to the CRs, to force all of us to come to terms with what we need to do in terms of funding. And we hear from all of you all the time about the need for stable funding and that is the greatest thing that we could do to help you do your jobs. And sad to say we have fallen short of that. We will try.

Admiral Conn, the Navy strike fighter shortfall estimate has fluctuated widely over the past several years. In simple terms, there are two pieces to solving the strike fighter inventory gap: buying new aircraft and extending the service lives of the ones we already have.

According to budget documents, the Navy has lost some ground for near procurements since last year. Over the period from fiscal year 2019 through 2023, the Navy had planned to buy 308 tactical aircraft. This year over the same period, the Navy only plans to buy 289 aircraft, even taking into account congressional adds to the fiscal year 2019 budget.

Admiral, why have you reduced the planned aircraft procurements over the FYDP?

Rear Admiral CONN. Quite frankly, some of the reduction in aircraft were to pay bills. Some of them were to get wholeness in certain weapon systems, F-35, C2D2, block 4. It came with a bill that we had to pay.

Senator HIRONO. You had to transfer some money in order to do that with the block 4. Did you not?

Rear Admiral CONN. In terms of the budget year.

Senator HIRONO. Yes.

Rear Admiral CONN. Not in year of execution. And then as well as in the 20 I understand.

In terms of the strike fighter inventory management, our lowest point based on PB20 budget is about a 51 aircraft deficit in fiscal year 2020, and that decreases to single digits by fiscal year 2024. That is through the F-18 procurement that is in PB20. It is the F-35C procurement that is in PB20. And it is also the service life modernization effort, taking those block 2 Hornets making them block 3, get them to 10,000 hours. When you add up all those numbers, that is what is driving it.

We are finally in a position of buying or producing more aircraft than we are burning up every year in terms of flight hours. That

is going to allow us to get out of older airplanes, provide best of breed opportunities for the Marine Corps. It is going to provide us to be able to start to strike in some of our old airplanes, block 1's that will never be block 3's. It provides enormous opportunity in this budget request.

Senator HIRONO. So when do we get to that point that you are describing that situation? How many years will it take for us to—

Rear Admiral CONN. We get to single digits strike fighter inventory management by fiscal year 2024.

Senator HIRONO. Fiscal year 2024. We are probably going to keep asking as you during every fiscal year whether we are getting to that goal. Thank you.

Again, Admiral, I understand that depot throughput of aircraft at the fleet readiness centers has improved over the last couple of years. Has this improved productivity contributed to improving the strike fighter shortfall situation that we talked about?

Rear Admiral CONN. Yes, but let me be very brief here. We have had, since January, a naval sustainment system effort in place and working with industry where we bring in some of the best of industry to look at the various functions we do to maintain our aircraft at the depot level, at the squadron level, how we do engineering, how we do supply. And we have seen some pretty good results from the targeted focus in Lemoore, California and FRC Southwest.

We have been able to reduce our planned maintenance intervals on Super Hornets from 120 days to 60 days. And the quality of the product is better. It is getting on a flight schedule within a week, let alone weeks or months.

We have been able to reduce our turnaround time, 40 percent to some of our highest degrader lists, generators, interrogators, displays in cockpit.

We have been able to drive down backlogs in our rudder service zoners that were keeping aircraft down. We had a backlog of over 60 of those parts in January. We got it down to zero, zero in March.

All that is allowing us to improve the mission capability rates. In January, we had about 257 mission-capable Super Hornets. Last week, we had a high, a snapshot in time, of 304 in that time period.

Senator PERDUE. Is that 80 percent?

Rear Admiral CONN. That is short of 80 percent. Eighty percent would be 320 of the roughly 400 PMAI [primary mission aircraft inventory] aircraft.

Senator HIRONO. I commend you for that. That took a lot of very focused effort to make those kinds of changes and reduce those times.

Rear Admiral CONN. It took effort but not a lot of money.

Senator HIRONO. Which is really music to our ears. Thank you very much.

And for the Navy-owned shipyards—can I just ask one more question of the Admiral? The Navy has begun a multiyear, multi-billion dollar rehabilitation program that was long overdue, and I think you had talked about that just now. But what plan of action is the Navy implementing to further improve depot throughput on

the F-18 SLEPN, thereby improve F-18 aircraft availability to the fleet? So specifically regarding F-18's.

Secretary GEURTS. Ma'am, maybe I will take that. Then Admiral Conn can give the kind of operational.

Similar to our shipyards, which were in dire need of recapitalization, we are doing the same thing on the aircraft side. Some of it is in situ, as Admiral Conn said, reenergizing the teams, re-laying out what we can within the facility. That brings you to a place but not all the way. We have invested our normal legislation that says 6 percent of the working capital fund in the facilities. We are at 10 percent right now. So we are making up for not having the investment we needed to have in there.

And as General Rudder said, we are treating the depots as a weapon system in the fact that we cannot generate the force needed if they are not operating and we do not think of them every day as the key vital enabler for our combat power today. And so we are looking at both immediate investment in people talent and equipment, as well as long-term investment, so that we have them rigged. As we get this readiness improved, we need to sustain that improved readiness. I do not want a sugar high where we bump up real quickly and we have not made the long-term investments that do not allow us to stay up on step. And so that is where we are working across all of our different FRCs to make sure that they can sustain this improved performance we are seeing.

Senator HIRONO. So do you have a plan for modernizing the fleet readiness centers that is analogous to the Navy shipyard modernization plan?

Rear Admiral CONN. We do.

Senator HIRONO. Good. Thank you.

Rear Admiral CONN. And there are three specific examples, if I may. We are investing \$42.5 million in this budget to go after some modernization of our FRCs. Multi-access moving machines is one. If you have a landing gear, and you have to drill five holes with the equipment we have today, you put the landing gear down, you line it up with the drill, you drill a hole. Then you got to move the landing gear, realign the drill, and drill a hole. The multi-access machine does all the work. You do the labor once. It reduces timeline. It reduces scrap rate.

Another one is a cold spray booth. When we get tail hooks or landing gear in the FRCs, the first thing you have to do is remove the paint. We scrape it and sand it. Cold spray booth—you put it in the machine. It removes all that material quicker, and there is less chance of damage to that equipment in the process.

It is getting our FRCs into the 21st century because they are a weapon system that attacks our readiness challenges.

Senator HIRONO. Thank you.

Thank you, Mr. Chairman.

Senator PERDUE. Senator Hawley?

Senator HAWLEY. Thank you, Mr. Chairman.

I had the chance to sit down with General Neller a few weeks ago, and we talked about a number of things, but one of the issues he raised with me was his concerns about the CH-53 King Stallion and the issues that we are having there.

Secretary Geurts, maybe I will direct this question to you. Can you give the committee an update on the CH-53 and the problems we are encountering there?

Secretary GEURTS. Yes, absolutely. When I came on board now December 2017, that was a program, as I looked at it, that was not where it needed to be. We were not achieving the test points that we needed to at the rate we needed to, and we did not have a real plan to deal with fixes we needed to make in the production aircraft after we discovered them in test. It was not anybody's individual fault. It was just the way we set the strategy was not working for us.

And so we took a pause. I took a pause on awarding the production contract. We took a hard look at the team and restructured the test program, really focusing on what do the marines need day one.

It is an incredibly important helicopter. General Rudder can explain operationally why. My job is to deliver it with confidence.

So we have re-laid out the test program. We have reDONE our production contracts, and we have included in that negotiation on these contracts we are about ready to award incorporation of the known fixes into the production lot as opposed to retrofitting them after delivery, as well as some capacity in those aircraft to deal with problems as we discover them in the future so we can reduce a concurrency risk, which was really what was bothering.

The good news is we have a design that provides the capability. We have tested the hardest parts. So we are fairly confident that we have got the design right. We have some issues we got to work through. And that was the whole goal in that restructured program.

So I am in the final stages of getting ready to award that production contract. I would expect that in the next coming weeks. When we do that and we have the restructured test program, that to me gives us a solid program with which then we can go execute and be measured against our execution.

Senator HAWLEY. But you are satisfied that the design is where you want it. You think you have got those issues ironed out.

Secretary GEURTS. I think we have the major ones ironed out. We are still in the middle of a test program, but we have, to the program's credit, tested a number of what I will call the hard points and, as General Rudder would probably say, corners of the envelope. So I am comfortable. I mean, we got thousands of hours on flying the aircraft. There are some things we need to fix. I want those fixed in the production airplanes when they roll off. I do not want them to have to be a retrofit after the fact. That was the whole idea of our program restructure.

Senator HAWLEY. General Rudder, let me just ask you. The CH-53 sounds very capable. However, do its capabilities justify its premium price over, say, the CH-47? Are we going to get bang for the buck here? To be honest with you, I was disturbed by General Neller's comments, and he expressed pretty significant frustration to me about the status of this program. So is it worth it is what I am asking you.

Lieutenant General RUDDER. I think if we step back and we look at this program as a heavy lift helicopter, it is the only one that this nation has that can do what it can do. And if you look at what

this helicopter has DONE this past year, we are restructuring it because we have learned the hard way about concurrency, and the Secretary is doing a great job negotiating that concurrency in. So when the marines get it, they will get a good product.

But there is no other helicopter in the world that has lifted 36,000 pounds, can take this 100 miles ship to shore with 27,000 pounds at 100 miles and go back and forth all day long. So when you look at the hours this thing—it is flying today—over almost 1,500 hours of test time.

Now, we need to fix deficiencies. Some is seat cushions, the handholds, the engine gas reingestion. And the vendor and the program office are going to fix these, and we are going to hold them accountable to fix it. But if we look at the future of what this nation is going to have to do with the NDS and distributed operations, you are going to need logistics. You are going to need heavy lift because we are going to be distributed. We are going to be eating a lot of gas. And this is the ship-to-shore connector that will do it for us. There is nothing else out there in the inventory. I know you mentioned CH-47. We could talk about those numbers offline, but that will not get there.

And I think the last thing I will say is for the Marine Corps, it has got to be shipboard compatible. I have to be able to put it on the ship, hold it, park it, and that is one of the challenges we have with any of the Navy marine aircraft is that shipboard compatibility.

Senator HAWLEY. Thank you very much.

Let me just ask briefly, Admiral, in the time I have remaining here. Let me ask you about the F-35C. Now that it has reached initial operating capability, what is its operational readiness rate? Are you satisfied with that? Where are we?

Rear Admiral CONN. The FA-147 IOC [initial operating capacity] in February—part of this is the numbers. I have 22 of those airplanes right now. Seven of those are in that squadron. They will get their tenth as they begin the workup. We have seen anywhere from 60 percent MC to 80 percent, in excess of 80 percent MC. It depends on which day we are talking about. But remember for the PMAI piece of the F-35C, that is seven airplanes right now. So you see some big fluctuations.

Senator HAWLEY. Thank you.

Thank you, Mr. Chairman.

Senator PERDUE. Senator King?

Senator KING. Thank you, Mr. Chairman.

We have been talking mostly about hardware. I want to talk about people for a bit. I know the Air Force has a significant pilot shortage and mechanic shortage. Bring me up to date on the Marines and the Navy on those two areas. Admiral? There was a GAO report that said this is a persistent problem.

Rear Admiral CONN. It said 9 percent shortfall overall, 26 percent shortfall in first tour aviators. Part of that is tied to our T-45 when we had to red stripe and we had to shut down for a period of time. We knew that challenge was coming. We are going to have to extend people in assignments or rotate people or squadrons run the maintenance for basic phase. Maybe we do not push those people to them. So that is in terms of where we are.

I think some of the authorities you have given us in terms of bonuses, the department head bonus and the increase in rates has had some impact across most type model series. We have seen no impact to the VFA community.

Senator KING. Talk to me about recruitment rates. Where are we? Are we bringing in as many pilots as we are losing?

Rear Admiral CONN. We are bringing in our goal. Now, do people get a vote when they have the option to get out?

Senator KING. That is the second part of my question is retention.

Rear Admiral CONN. Retention? We are seeing a lot of experience, and they are all very good, but some of our best are deciding to go to other things. We are in a competition for talent. The airlines are continuing to hire. But some of these folks are going to grad school. Some of them are starting their own business. The economy is doing well. There are choices. There are sacrifices that we have. It is a challenge that we have. And it is particularly at the more senior levels where we are seeing the challenges the most.

Senator KING. Senator Cotton and I about a year ago had what amounted to a focus group with young Air Force officers about flying and why we are losing them. And interestingly, the discussion did not turn on money. We are never going to compete with the airlines.

Rear Admiral CONN. True.

Senator KING. It turned on flying.

Rear Admiral CONN. Correct.

Senator KING. And the concern was getting onto a track that led you to too much time behind a desk, and these are people that joined the service in order to fly. Lifestyle and length of deployments and ability to actually have time in the airplane seemed to be the more important factors. Are you looking at those?

Rear Admiral CONN. We do a survey for every pilot that decides to leave. Three factors: not doing what they signed up. They are not flying enough, which means we need to get our readiness where it needs to be to get them in the air.

Two, there is some quality of life issues more so in our non-fleet concentration areas, Lemoore being one of them.

Three, is the pay gap that is coming up in the surveys that we have DONE.

So the additional authorities for the bonuses, quality of life issues in Lemoore, and everything—

Senator KING. Quality of life and time in the cockpit is on you.

Rear Admiral CONN. It is.

Senator KING. That is a management challenge.

Rear Admiral CONN. Absolutely.

Senator KING. And I take it a similar story in the Marines?

Lieutenant General RUDDER. Yes, Senator. We look at really three big bins, and the flight hours is one of them. Pilots want to fly, and for certainly the young pilots. All of these readiness issues we talk about, we want to get to a percentage which looks really good, but what that translates to is flight hours. And if you look at the Marine Corps, in fiscal year 2016, we were at 13.5 hours per pilot on average.

Senator KING. Per?

Lieutenant General RUDDER. Per pilot on the average per month. In 2017, we were at 15.4 hours per month per pilot. And in 2018, we are at 17.9. And now we stand around 17.1. So in that regard, I think some of the younger pilots are beginning to fly now.

Now, the deployment. Some things that are out of our hands a bit and that is we are still in combat. And if you are an AV-8B pilot, you are either on the boat, you are getting off the boat, or you are getting ready to go on the boat again. I mean, it is a pretty quick turn, and we are running those folks pretty hard. The same with the V-22.

So then you look at incentives, and incentives are something that it is not all about money and we hear that loud and clear. But it does help in some of the higher grade officers where they have got to make some tough choices.

Senator KING. You are saying all things being equal, money helps.

Lieutenant General RUDDER. Money helps. It really does.

Senator KING. It is hard to argue with that.

Lieutenant General RUDDER. It is. It is hard to argue with that.

Senator KING. I have just got a few seconds left.

Mechanics. That is a bottleneck too. Is it not?

Lieutenant General RUDDER. So we have initiated for our higher qualification mechanics—we have given them a reenlisted bonus. We first started doing it a couple of years ago. And what that has equated to is out of the 1,500–1,600 reenlistments, if you had the collateral duty inspector or quality assurance representative duty, which is a higher qualification of mechanics, you were going to get \$20,000 to enlist for 4 years. And the deal was that you had to stabilize in that squadron. So with the numbers that we were able to reenlist with that program, it equated to about 10 qualified mechanics per squadron that we were able to—

Senator KING. Are you getting them?

Lieutenant General RUDDER. We are.

Senator KING. Because my concern is that if we get into a situation where we are short of both mechanics and pilots and we end up with longer deployments and more of those kind of activities, it becomes a downward spiral that aggravates the problem. I take it you are attentive to that.

Lieutenant General RUDDER. Yes, sir. I agree.

Senator KING. Thank you, Mr. Chairman.

Senator PERDUE. Senator Tillis?

Senator TILLIS. Thank you, Mr. Chairman.

Gentlemen, thank you for being here and for your service.

General Rudder, I am kind of curious. I want to get an update on the F-35 and specifically some of the work we are doing down at Cherry Point. We have made some of the initial appropriations for the lift fan facility—if you google the cradle of civilization in God's country, it is pretty much close to right there and home to about 45 percent of the Marine Corps. But other than that—

But, no, I am interested in seeing how that is going, how the deployment is going. I know that we have had some information on the production of the Joint Strike Fighter. I do not know if we are shifting to the right, but I would like to get an update first on

Cherry Point, what we are doing down there at FRC East, but then more broadly the program. I will start with you, but I am happy to have anybody else.

Lieutenant General RUDDER. You are referring to really two products that we have ongoing this year.

One is the repair facility that North Carolina really helped us very graciously with that. The repair facility is on contract. It should be DONE by 2020, January of 2020. So that is on track.

And then the other side of that is the lift fan test facility. So they will go hand in hand. That should go on contract this year, and it is going to be a 2-year build. So I would imagine that by 2021, we will have that up, and then it will take another year or 2 to qualify that lift fan. But that will be very important for the F-35B because there are only a few places in the country that you can actually test—

Senator TILLIS. Mainly at Rolls Royce in Indiana. Right?

Lieutenant General RUDDER. That is correct, Senator.

Senator TILLIS. And with the current production schedule—I know at one time when we were first talking about it, we were tracking towards their capacity tapping out at about the end of 2020, beginning of 2021. I do not know if the production schedule has lifted some of that pressure off, but that is what I was particularly concerned with.

Lieutenant General RUDDER. I think that 2023 is kind of the target that we are looking at, and somewhere before that, we will go to either a longer first shift or a dual shift test fan, lift fan facility workload before we get ours qualified in North Carolina.

Senator TILLIS. Mr. Chair and for the committee, General Rudder alluded to it, but I want to thank the members of the general assembly and the governor because we went out and reached out to them and told them the economic impact that it was going to have down in the State. And we wanted to make it very clear that the State is solidly behind them. So they appropriated \$5 million out of their general fund in North Carolina for the use of the Navy and for the Marines to actually accelerate that project.

I will tell you, though, there was a learning there because I went to the speaker and the Senate leader a few years ago. They had the first seed money, and then they went back and added more money. And we have this money that the State is wanting to give the Federal Government, and I had to work a little bit and intervene to get to yes because we were having some sort of procedural review breakdown where they go, well, before we take this check from a State entity, we have got to assess this. So I think that that is one thing. If we want to incent other States to do this when it is in our mutual interests, we want to make sure that that process is streamlined. But I appreciate the end result. I think it is where we ultimately wanted to go.

The other question I have, since I have a limited amount of time—I know what your priorities are. I tend to agree with them and will do everything I can to support them. But I think you also need to do some modeling based on gaming out how the appropriations process is going to go. And if you come in and do a sensitivity analysis, this is what you can do if we appropriate the money you want.

But I think we also need to understand what specific programs will be directly impacted. Hopefully, you are not going to peanut butter it and make them all go slower. Some may, just based on priorities, have to be on hold. I think that it will help us work on both sides of the aisle to say these are the material consequences if you get less than you expect to get. And we need to know that beforehand so people know the consequences versus just come up with a generic funding level and then 6 months later, we find everybody starts hemming and hawing because they do not recognize what it is ultimately impacted.

The last question I have for you all really relates to the future. Now that we see unmanned and other technologies on the near term horizon, I think the other thing that would be helpful in the future is say to what extent are some of these new and emerging technologies going to impact some of your current thinking about already committed to capabilities. So we have got near-term opportunities that probably will not affect near-term priorities for fielding capabilities, but they could in the longer term. And I think that the sooner that we get that so that we get people less obsessed with hitting a number based on what we know today and more focused on the general capabilities that you think are the best for lethality and projection of power, I think that would be very helpful to us.

Secretary GEURTS. Yes, sir. And just briefly I would say my experience has been, especially coming from special ops, it is an either/and. It is not an either/or. And the real strength is each has its benefits and challenges. And our experimentation approach—and I will give a shout out to the Marine Corps for actually getting it in the hands of the operational units and letting them experiment with it and really figure out that right balance and how do those each help each other versus compete each other between unmanned and manned and autonomous and manned I think is really where the opportunity lies. It is not one or the other. It is to figure out how to get both the unique capabilities playing best together and operational design will win.

Senator TILLIS. The best and highest use. But I think that that feedback will be helpful because it will be instructive to our future planning, future production priorities.

Thank you all. Thank you for your service.

Thank you, Mr. Chair.

Senator PERDUE. Senator Blumenthal?

Senator BLUMENTHAL. Thank you, Mr. Chairman.

Major Berger—well first of all, welcome to all of you and thank you for your service.

Major Berger, I was—I am sorry. General Berger. A bad way to begin—

[Laughter.]

Lieutenant General BERGER. I have been called worse by my wife, a lot worse.

[Laughter.]

Senator BLUMENTHAL. Well, it sounds like you and I are in the same boat in that regard.

General Berger, I was interested to see a recent article—and I am sure you are familiar with it—by Dakota Wood about MARSOC

[Marine Special Operations Command] basically arguing against the request that is made in the 2020 budget to increase the billets for MARSOC, in fact, arguing that it ought to be disbanded entirely. And I think this is a fundamental question for the Marine Corps, and I would be very interested in your views on that.

Lieutenant General BERGER. I just want to make sure I understand the question, Senator. Is the question should we expand MARSOC, do I think we should expand it?

Senator BLUMENTHAL. I am sorry. The article argues that, in effect, MARSOC ought to be disbanded. It is an article that was printed I believe by the Heritage Foundation, and it is written by a marine strategist who worked in the Marine Corps Forces Special Operations Command between 2012 and 2013, Dakota Wood. And the article is not necessarily the topic of the question, but more the argument made in the article, which is that MARSOC should be disbanded because those billets and those resources could be better used in a more—to use a word that perhaps fits, a more traditional Marine Corps function. And I wonder if you could expound a little bit on why the Marine Corps is asking to expand MARSOC, and why you think disbanding it would be a bad idea.

Lieutenant General BERGER. When the Special Operations Command was formed, the Marine Corps did not jump into that game at the time, as most people are aware. We waited. The Army, Navy, and Air Force formed their service components, and the Marine Corps watched from the bleachers to see where things would go.

When we create Marine Special Operations Command, it was after a great deal of deliberations, some of which General Rudder and I were more junior to but watched and listened and followed along.

At this stage, I would tell you they have—my personal opinion or our opinion—that they have developed farther, faster than most thought possible perhaps not because they are wearing the Marine uniform. But we operate sort of as a joint force every day with aviation and logistics and ground. So it was a natural fit for them. And the small unit level leadership that they depend on is a natural fit coming from the Marine Corps.

I think they are vital. I think the Special Operations Command and the joint force is better for them. The adjustment of each service's special operations force is an ongoing debate or discussion about what is needed going forward. And that I am not qualified to talk about, sir.

Senator BLUMENTHAL. Thank you.

Let me ask because my time is limited—this topic of MARSOC is one that I would like to pursue in the future. But for now, let me move on to a discussion that I had with the Army and Air Force in similar subcommittee hearings regarding combat equipment for women, a topic I know everyone on this panel is familiar with.

When I asked the Director of the Army Acquisition Corps, Lieutenant Ostrowski, about this issue, he said the Army has made ongoing adjustments. Just yesterday, I asked the folks from the Navy and I have asked the Air Force as well.

I wonder if you could describe for us what the Marine Corps is doing to make sure that this gear, whether it is body armor or

other personal equipment, takes account of the needs and so forth of female members of the Marine Corps.

Lieutenant General BERGER. I can tackle that, Senator. Most of us sitting up here wore the original like OTV or whatever it was called in the mid-2000s. There was small, medium, and large, and you usually did not get whatever size you were after anyway.

In between then and now, huge progress and beginning in 2012 I think with a great deal of effort towards expanding the fit to fit female marines. We now wear plate carrier vests, and all the way from the 2 percent to the 98 percent, it is a solid fit. It was designed with them in mind, not as an afterthought. But the plate carrier vests we wear right now were designed with female shapes and sizes in mind from the beginning.

Senator BLUMENTHAL. Thank you very much. My time has expired. Thank you for being here today.

Senator PERDUE. Admiral Conn, would you talk about the current fleet of airplanes? In the last decade since sequestration, we had a 25 percent disinvestment in the military. So that is from a static number. It does not count what should have increased with inflation, et cetera. So 25 percent has put you in a position today where you are flying more fourth gen than you would like. Would you talk about the mix of fourth gen-fifth gen today and your future vision of how you would interface the fifth gen planes as they start to enter into your fleet?

Rear Admiral CONN. Number one, we will not get to our program 50-50 mix until 2030.

Number two, our first fifth gen aircraft will deploy in fiscal year 2021.

When I look at the weapon system that flies off our carriers, known as a carrier air wing, I look at the combined capability because we can carry 60 to 70 aircraft, elevated sensors. We can throw mass at the problem.

I foresee the F-35 operating forward, sensing, collecting, and relaying information back to a weapons truck, known as a Super Hornet. I see the E-2D involved in relaying critical information to all those fighters out there while the EA-18G Growler, with next generation jammers providing coverage.

So it is that system of systems, and quite frankly, it is where the whole is greater than the sum of the parts. And that is why we can do the 50-50 mix because of the capabilities and capacities that we can put on our aircraft carriers. And that is relevant until about the end of the next of the next decade, 20.

And then we are going to have a NGAD discussion, next generation air dominance. The A-way will be complete in a couple months, report out this summer, which will inform future choices. I see greater unmanned capacity going on our air wings, and we are going start with the MQ-25 that we are going to field as soon as possible that is going to extend the operational reach of that air wing. We are going to look for opportunities. Part of this is when I look to the future, I look to the past. PBYS and you look what they did in World War II, out there operating far from the fleet, relaying actionable information to decision-makers, something that we probably need to look at and start getting after.

Senator PERDUE. You talk about getting information from a little different parts, and the sum of the parts equaling more than the whole. Does that include integration with what the Air Force is trying to do with ABMS right now, the advanced battle management system, with the Army?

Rear Admiral CONN. One, we will have the tactical grid that I think the joint force is going to have to plan.

Two, I am looking for weapons' quality to track information from anywhere that I can get it, either internal to the carrier strike group or battle strike force or external. I do not care where it comes from. I just want it in those cockpits, sir.

Senator PERDUE. Thank you.

General Berger, real quick. The Marine Corps started to field the JLTV [joint light tactical vehicle] in its 2019 request, and you have increased the numbers requested since then. At the same time, the Army—and this may be just their decision to reallocate dollars—has actually slowed it down. I am not trying to read anything into that. But what is your assessment of the JLTV program today, and what feedback are you getting from your marines as they are beginning to operate that?

Lieutenant General BERGER. Thanks, Senator, for the question.

Your assessment is accurate in terms of the Army delaying a full rate production decision, which we think will be in May now, unless you have heard something different. But they did that because there were three aspects of the vehicle they wanted the vendor to continue to work on before they went to a full rate production decision.

In our budget, we procured 1,400 this year. They are being fielded this month. They will deploy this year on board ship.

So how are they doing? I think we will know the answer to that within a month or 2 because marines will begin driving them later on this month, and they will go on deployment later on this year.

We are happy with the vehicle. It does things that the Humvee could never be able to do.

Senator PERDUE. In that vein, I have a few seconds left. Let me go ahead and get this out of the way too—this question for you, General Berger. Since canceling the expeditionary fighting vehicle, the EFV, in 2011, you have chosen to pursue a more measured multi-phase acquisition strategy, and you moved toward combining the ACV 1.1 I believe and the 1.2.

Can you give us an update on that strategy? Do you still have confidence that is the right direction? And how do you see that fitting in, and when can we expect to deliver that vehicle?

Lieutenant General BERGER. Thanks, Senator.

It is in test right now, and the reason—I will not speak for the Secretary. We are happy as a Marine Corps when a system is doing better when you had forecasted, which is why the Secretary was able to do it. The 1.1 was doing so well that we can move faster. We are happy with that vehicle as it is moving through test so far. The marines are happy driving it compared to the AAV that they are operating.

And I will ask Secretary Geurts if he has any other comment.

Secretary GEURTS. Yes, sir. I mean, it was my decision to put those together. And we did that.

I will applaud the team, a really smart government team, that thought on how to capitalize up-side opportunity. We spent a lot of time managing down-side risk. We are not in the acquisition community nearly as proficient as taking advantage of something. And so the team did a lot of work to test to the 1.2 requirements even though it was a 1.1 design. So that allowed me to have the confidence that we have the data, that we were already testing it. The operator feedback was what we wanted. So they thought proactively, and then we put an acquisition strategy that allowed us to accelerate. That brings gear to the fleet faster. It is much more cost effective, and now we can focus some of that R&D [research and development] on what is past 1.2, not just redoing the R&D [research and development] just for the sake of redoing it.

Senator PERDUE. Yes, sir. Thank you.

Senator Ernst?

Senator ERNST. Thank you, Mr. Chair, very much.

And thank you, gentlemen, for being here today. I truly appreciate the time that you have given to the committee and for your service as well.

We know that we have to support a multi-domain dominance. That is critical to our NDS. And we know that we have to have advanced ground forces and we also need to be able to support our aviation assets as well. So thank you for that.

I would like to start, of course, by talking a little bit about aviation and the opportunity that we might see in the future. One of the biggest challenges that we do have in aviation right now is pilot shortage and understanding how, one, can we either recruit and train more pilots or are there other ways of doing business that we need to look at in the future and that would include autonomous systems?

And I understand. I get a lot of pushback from some of our pilot friends out there. I was able to go out about a year and a half ago and bag some traps on the Abraham Lincoln. It as a great honor to do that. But in the absence of additional pilots, we do need to look at other ways of doing business.

So with that in mind, what steps have the Navy and the Marine Corps taken as far as developing manned or unmanned systems that can be utilized in the future? General Rudder, would you like to field that first?

Lieutenant General RUDDER. One of the interesting projects we are doing right now with our K-MAX helicopter—we bought two of these to use in Afghanistan as an autonomous logistics delivery system and we—because of the graciousness of Congress allowed us to have funds for that this year. So we are trucking them back to Connecticut to have them retrofitted to get them back flying again and having them retrofitted with some systems that will make them autonomous. We hope to get them back next year, and that will allow us to go back and experiment more with autonomous systems.

So what we have found is although you have logistics that you need to get to the right place at the right time, you also need a workhorse that just does this automatically. And we are hoping that this research project will allow us to really get in the autonomous part of that particular system.

Also for our MUX, our MAGTF unmanned expeditionary system, that we are developing now, a group 5 system that can come off the ship, we would like to have that be an autonomous early warning electronic warfare asset. It has long loiter persistent time that does the job of what an E-2D would do off the carrier, but it does that for the amphibious ready group. So we are working on that.

All these things lead into artificial intelligence. It is all tied together. But I think you are exactly right.

And I will offer one comment as I back out of the mike is sometimes there is nothing unmanned about unmanned. Some of our most precious assets right now are the folks that fly our unmanned systems right now. So autonomy is key to try to alleviate the human link in that.

Senator ERNST. I appreciate that. Thank you.

And we have talked about this as well, for us ground pounders, the logistical trains that we have using autonomous vehicles. So the fact that we might look at that as an aerial delivery system is pretty important as well. So thank you for that.

Secretary GEURTS. Ma'am, maybe if I could, just one quick add.

The other thing that we are doing is looking at it both architecturally and programmatically. So on the carrier, we are going to have one common data link to talk to anything unmanned so that we do not get into the situation of we have to have 10 different unmanned data links intended for war rooms and all that. So when we talk about forward, when we talk about where we are going forward, it is to open up our ability to take whatever comes. And so as that vehicle, whatever it looks like, is discovered, invented by whomever, we can quickly integrate it into the weapon system and not have to wait years and years for another carrier cycle to get through. The same with the amphibious cycle. So you need both pieces.

Senator ERNST. Thank you, Secretary.

Admiral?

Rear Admiral CONN. I have a list of capabilities that looks like a pyramid, and at the top are three things: automation, manned/unmanned teaming, and artificial intelligence. I see that as accelerating the observe, orient, decide, act, make quicker decisions, provide more lethal actions. I see those required to drive simplicity down to the tactical level because our tactics are overly complex right now because we are facing overmatch. We have to use those tools. And as we get a better understanding of what automation really means, in light of a pacing threat where an enemy gets a vote and mother nature gets a vote, what is the true capability of that? And the artificial intelligence—that is going to better inform where we are going in the future. But we have Triton going out this year. We have MQ-25 coming as soon as possible that we need to leverage that work and get a better understanding of those attributes.

Senator ERNST. Sure. Thank you.

And if we could talk a little bit too about emerging technologies. I chair the Subcommittee on Emerging Threats and Capabilities, and there are a lot of technologies that—and Secretary Geurts, we have discussed this before. But respective to aviation and ground

combat, what do you see as the most important emerging technologies that maybe we need to be focusing on?

Secretary GEURTS. I would put it in a couple categories. One, as Admiral Conn put this, autonomous, a decision aid kind of area, whether that is unique to the platform itself or in the larger, either in a strike group or in the overall fight.

And then I think there is a whole new category—we have been working on it for a while—on different weapons, directed energy, a whole range of different ways so that we get away from our only kind of answer is a 1,000-pound something that has got to get transferred out that you only have so many of because if we are going to operate at the rate, we are not going to have time to steam bombs around.

And then the third piece is how do we network in, connect everything together. So to Admiral Conn's point, I do not care where the sensor is, I do not care whose nameplate it is on the tail, whoever can get the sensing information to the shooter the quickest with the right decision aids will win.

And I would say those are kind of the three macro technologies. How to operationalize those is really important because you can have the technology, but getting them into—and continuing to invest in experimentation at unit level, at battalion and higher level is absolutely critical.

And then the final piece is it is not technology but it is thinking, is how do we continue—and we are doing a lot of work on our acquisition programs, again to be able to insert the technology much faster than we are right now. I mean, there is a whole range of technologies in software development. I think if we can get the technology development put together, then operationalize it, and quickly integrate it, we will be in really good shape.

Senator ERNST. Thank you. I appreciate it. My time has expired. Thank you very much.

Senator PERDUE. Senator Hirono?

Senator HIRONO. Admiral Conn, I was very interested in what you just said about that we are facing an overmatch. With whom? Are you talking about Russia, China, or who?

Rear Admiral CONN. Yes, ma'am.

Senator HIRONO. And this is why your pyramid, which was kind of an intriguing way to frame it, that you are looking—what was at the top of the triangle?

Rear Admiral CONN. Artificial intelligence.

Senator HIRONO. And so how much investment are you putting into developing AI?

Rear Admiral CONN. I think AI may mean different things to different people. The algorithms that we are developing and our fusion engines for decision aids is probably the best example.

Senator HIRONO. So in terms of the monetary request, are you putting enough into the kind of research and development that you have to do for AI?

Rear Admiral CONN. I do not think this is simply an aviation discussion, and I will ask the Secretary if he has any comments.

Senator HIRONO. Sure.

Secretary GEURTS. Yes, ma'am. And I would be happy to take for the record kind of a full accounting. We have some investment in

the S&T [science and technology] arena, and then we have some much more focused investment kind of on the platform piece. And so if it is okay, I just will take the question for the record to lay that out.

[The information follows:]

The fiscal year 2020 budget request includes significant increases to naval investments in Artificial Intelligence (AI). A majority of these investments remain in the science and technology area (BA1–BA3). The increase recognizes AI's potential disruptive capability and broad applicability, as well as the investment made by other world powers in AI. Congressional support is welcome. Focused AI investment is beginning to emerge for Naval platforms and acquisition programs as well. BA4 Program Elements with AI investments include Digital Warfare, Naval Advanced Submarine Systems Development, and Expeditionary Logistics. Additional information can be provided in a classified setting.

Secretary GEURTS. And then I guess working closely with the joint community because at some point—I do not again care where the algorithm comes from. And so if the Joint AI Center is building out or one of the other Services, we are doing a lot of investment in looking at our data so that we will be able to apply those algorithms quickly to the data we have. And I think you need both halves of that equation.

Senator HIRONO. So if you are saying that we should not be operating in a siloed way, therefore we have to make whatever appropriations, whatever amounts—those resources have got to go as far as they can. So you will have to be working in conjunction.

But I am curious to know if resorting to AI—I should not say resorting. But if we are looking to AI [artificial intelligence] and unmanned systems, et cetera, that is going to become an increasingly important part of the readiness frame, then I would be interested to know a bigger picture of how you see the resources going toward those kinds of developments.

Last year, I asked the witnesses—this is for General Rudder and Admiral Conn. I asked the witnesses at the Seapower aviation hearing what changes have been reflected in the fiscal year 2019 budget to adjust to the new National Defense Strategy. And I cannot say that the witnesses were able to identify significant changes. There have been changes made to other parts of the budget, but I cannot identify any specific changes from the strategy change in Navy aviation programs.

So for both of you, could you describe how you believe the Department of the Navy aviation programs have been changed to reflect the new NDS? General Rudder?

Lieutenant General RUDDER. I think when we talked last year, the NDS was still in write, but we were tracking it with our two adversaries, our two competitors. And we were already planning to develop and field programs to meet that. For example, we were already fielding our first F-35 squadron, which is one of our largest long-range strike that fits into the NDS long-range strike. We were in the process of—and we had already, last time we talked, fielded the MFA 121 to Asia, our first F-35 squadron. We took it full-up round out of Yuma and immediately deployed it forward into Asia.

This year, we have two more squadrons that are operating. One just got back from its first combat deployment. And currently when you look at the USS Wasp out there right now, you have got 10 F-35's that are on that deck, and they are steaming to the South

China Sea and providing presence and working with our Philippine counterparts. So that long-range strike is down range.

What we did a little bit this year is because we have an agreement with the Navy to support them with their carrier operations is what you saw is a little bit of a change, a tweak between our F-35B and our F-35C numbers where we are endeavoring to buy 10 F-35C's. That is so that we can support the carrier deployment schedule. The Navy has their first deployment with VFA 147 in 2021, the MFA 314 will be the second Marine Corps squadron. It will be the second F-35C deployment and the 2021 and the 2022. So in that case, we kind of adjusted that a little bit.

We did look at ramping up Sage 53K, and we are kind of going to hold steady on that right now. But we are still tracking to do that. That is for a protective maneuver, NDS protective maneuver. That and the MV-22 is what is going to be the last tactical mile, if you will, for distributed operations for logistics distribution.

Senator HIRONO. So are you saying that we are sending more assets or replacing more assets or having more assets ready to go into the Indo-Pacific AOR?

Lieutenant General RUDDER. I think the other things that we have tried to do is—there are three kind of new things on there right now. And it has to do with adversaries. We know that for the NDS, we have to do and practice our adversary requirements greater. So we have some F-5's in there that we bought, and we are also getting ready to pull the trigger on more experimentation with our unmanned expeditionary system. So all these are coming together as protective maneuver, strike, and also the unmanned systems.

Senator HIRONO. Admiral?

Rear Admiral CONN. I cannot say this was driven by the National Defense Strategy, but I think it is reflective of what the words are in it. If you look at the weapons that will IOC inside this FYDP, LRASM this year, small diameter bomb next year, high altitude ASW weapon going on our P-8's going after a submarine. That is also in 2020. MALD, miniature air-launched decoy—that plays an important role if we are going to do some missions in the South China Sea. AARGM-ER, all those weapons that have greater lethality, greater range are IOCing inside of the FYDP. And then JSAL-ER is just outside the FYDP.

The National Defense Strategy talked heavily about readiness, and I think we have had that conversation and the investments we made, not just asking for money, but looking at ourselves in the mirror for process capabilities and our people, what do we need to do better and using industry to help ourselves in that process.

Senator HIRONO. Thank you.

Thank you, Mr. Chairman.

Senator PERDUE. Senator King?

Senator KING. Thank you, Mr. Chairman.

I want to talk about Marine Corps ground modernization. Where are we, General—I guess “General” applies to both of you guys. Whoever wants to respond—on the ACV and the JLTV? Is the ACV a unique thing to the Marine Corps? That is a unique product.

Lieutenant General BERGER. It is.

Senator KING. And where does it stand in its development process?

Lieutenant General BERGER. It is in testing as we are sitting here this morning. It went to a milestone C last summer, passed that fine. And then I think in January, Secretary Geurts looking at the progress that was made on 1.1 testing against actually 1.2 criteria, it was moving so fast and doing so well, they merged the two together into a single one.

Senator KING. Good progress. We are beyond requirements and prototypes.

Secretary GEURTS. Yes, sir. In fact, I was up at the production plan up in York 2 weeks ago. They are ramping into production. I was very satisfied with the progress we are making there. And we did an operational assessment before we made the milestone decision. So we got good, independent test feedback. We are in initial production right now. We have actually cranked a lot of the feedback from the operational assessment into the production line from the start, which I was very happy to see. And then we will go into an independent IOT&E cycle as we continue to ramp up the production rate.

Senator KING. And the JLTV—where are we in that process?

Secretary GEURTS. Yes, sir. Partnered with the Army. The Marine Corps is kind of on the front end of that buy. That has gone through an OT cycle.

Senator KING. Are the two vehicles, the Army and Marines, the same?

Secretary GEURTS. They are common vehicles.

Senator KING. Good.

Secretary GEURTS. As the Chairman mentioned, they are adjusting their production rate a little bit on the back end. That is okay. It does not impact us. We will take all the capacity we can get and field that as quickly as we can. General Berger can talk operationally, but from an acquisition and sustainment standpoint, that would be a great vehicle to replace all our Humvees as soon as we can.

Senator KING. We are well along that pipeline.

Secretary GEURTS. Yes, sir. It is a full-rate production decision. Right now, it is scheduled for May.

Senator KING. Good.

Ground-based radar, the GATR, and the ground-based air defense. Are they unique to the Marine Corps, or are those also joint with the Army?

Secretary GEURTS. Right now, sir, they are unique, although I would say they are getting some interest. They are progressing again well. We have DONE initial—

Senator KING. Just so the Army does not come in and say they need to develop their own radar system. You are at the apex of this. I hope we do not have to develop separate radar systems for two sets of people on the ground.

Secretary GEURTS. Correct, sir. My favorite form of R&D is rip off and deploy. So if they have got something we can adopt, we will. We have DONE that in a number of, I would say, smaller ground elements. On the vehicle side, we are well-teamed on JLTV, and we have had conversations with them on the radars.

Senator KING. Good. Rip off and deploy I like. Hold onto that principle.

General Berger, we have talked about people. We have talked about systems on the ground. How about logistics of getting your men and women to the battlefield? How do we stand on ship to shore and also onshore? How are you feeling about the logistics?

Lieutenant General BERGER. Of course, some of it is going back to the future, the way we were trained and operating 20 years ago. But the past 18 years of operating out of forward operating bases where you could pile as much sustainment as you want and protect it and operate from there, that fit the operating environment of the Middle East. It does not fit the operating environment that is our primary theater now.

So we are going to need more connectors, a family of connectors, I think going forward because connectors to us before today was a way to move from ship to shore. But connectors now are ship to shore, shore to ship, shore to shore, and we need the vertical. We need the surface. We need it all. If we are going to disperse and be able to operate in a distributed manner and sustain that force, our view of what connectors is is going to have to broaden.

Senator KING. And it seems to me we are also going to have to think about a contested environment, GPS disruption, communications disruption. Is that part of your thinking in terms of designing these systems? The cyber part of this—the other side has a pretty high level of capability. That is something we are going to have to be thinking about it seems to me.

Lieutenant General BERGER. It is the Commandant's number one priority, is command and control in a contested environment for the reasons you just stated, Senator. We have to write it into our requirements, every one, all of our systems. If there is a system that we have that cannot function under an adversary's pressure, then it is not going to last very long. It is going to go quiet.

Senator KING. I understand at the Naval Academy, they are now back to teaching celestial navigation.

Rear Admiral CONN. I was not fortunate enough to go through the academy, sir, but I think I have read that in the article.

[Laughter.]

Senator KING. But I think there is an important point there, that to the extent we rely entirely on electronic devices, if our adversaries can disable those devices, I do not want people not figuring out how to get from point A to point B.

Secretary GEURTS. Yes, sir. I think we have also got to not only think of a contested environment at the last tactical mile. I think as the Secretary mentioned yesterday, you can be in a contested environment just trying to get off the pier. And so we are looking across—you know, obviously, how the threat presents itself can change, but we are thinking about the threat in a different way, not just once we cross some line in the ocean, that is when the threat will now be on us. With cyber and some of these other threats, their ability to impact you much earlier and differently in the fight is something we are really looking closely at across both the Navy and the Marine Corps.

Senator KING. Mr. Chairman, let the record show that Secretary Geurts paid attention to Secretary Spencer yesterday.

[Laughter.]

Senator KING. Thank you.

Senator PERDUE. I do have a follow-up question on the GATR. The GATR, compared to other systems that are being developed, though, has an air traffic control dimension. Does it not? Specifically because of the Marine requirement. I do not think the other systems have that. It is irrelevant, but I mean, that is a major part of what you are trying to develop. Is that not true?

Lieutenant General BERGER. That is correct.

Senator PERDUE. With regard to the data links, I am very interested in how you managed to protect the hardening of that.

But I want to come back to what you just said. General Berger, I think you have said this in a hearing or in a private conversation. The days of sailing across the ocean, piling stuff on a beach, and getting into a fight on our terms at our time, those times seem to be past us. It is a time now where you have to fight your way to get in the fight I think are your words.

Talk to me a little bit about sealift. This looks like to somebody outside that this is a big investment that you only need when you need it, and it is hard to maintain it when you are not using it. Talk to us about how you manage that requirement, which we see is so important, and how you would protect it as it gets to the fight.

Lieutenant General BERGER. There is a broad view of prepositioning for the Army and the Marine Corps and the Navy, some of which is a prepositioning in set locations that you may or may not choose to harden, and that lessens what you would have to bring in.

And the second part of that is an afloat maritime prepositioning capability that both again the Army and Navy and Marine Corps have. We both think we are going to have to relook that going forward because that was built on a premise that you would have secure, benign ports that you could drive up next to in your 38-foot draft vessel and unload, as we did in Desert Shield/Desert Storm, and just keep cycling them in. That is a different operating environment. We need to be able to do those kind of things at sea to a connector. And it may be then on to another connector. Some will be prepositioned forward either afloat or ashore. And then the rest that is brought in—the distribution of that sustainment is varsity level stuff.

Senator PERDUE. I have one last question, and this is for each of you. As you look at the 2020 budget, what are the risks in that budget? Let me try to explain what I mean.

We all know that when you put a budget together, there are those things that you take risks in in order to fulfill the mission, whether it be in a business or in the military. In this environment, without going classified, can you talk about that? We will ask that question again in a classified arrangement eventually, but for today, can you talk about what is at risk in this budget that we need to know about?

Secretary GEURTS. Sir, maybe I will start and then certainly allow my teammates here to jump in.

I mean, certainly there are some high profile decisions that were made in the budget, one of them being retiring a carrier at its mid-life. Some of them were slowing down some acquisition programs, a ship-to-shore connector being one of them because of some challenges in that program.

Senator PERDUE. I am sorry. Was that a budget restriction or was that just the technical delay in developing that capability?

Secretary GEURTS. It was a realization of where that capability was. And so it was not a conscious decision we did not need them. It was a decision that we had not ordered the previous production ones. But you are always putting at risk sometimes—you know, can you make it through that production gap? And so we had to balance a lot of the pieces. And so some were fighting risks. General Berger, could probably talk about what we did on the AAV and some of the legacy systems.

And so the art of this is understanding how soon can you get rid of a legacy piece that you have to sustain and supply and all that, which by definition has some usable capability but may not be the capability you want going to the future and making hard decisions about I may retire that even though it still has some usable capability left, but if I do not, I have no ability to generate that 2.0 force. So you saw us making some of those decisions in the ground vehicles. You saw us make some of those decisions in large capital assets like the carriers. You are seeing us make some of those decisions in some of the C4 systems. My job as the acquisition guy is to inform the warfighter what those balances are, the risks that I can deliver in the future versus the risk of not having the thing you want to get rid of so that we can make informed decisions.

And so I would say generically that large risk is in retiring legacy as soon as you can otherwise you can never generate the dollars and resources available to then modernize because over time you will just put all your money into keeping the old car in your driveway and never get enough money to buy the new car you really need for the mission going forward.

Rear Admiral CONN. The only thing I would add is there is a capabilities discussion and a capacity discussion, sir. I agree with you. Capability is probably best in a classified session.

I would say the capacity discussion, in terms of where we are accepting risk, is reflected on the CNO's unfunded list for the capabilities for MILCON to high priority weapons, sonabuys that we put out a lot of in recent years. So that is where I would look to see where the risk is and get in front of that.

Senator PERDUE. Yes, sir.

Anything else?

Lieutenant General RUDDER. I think I would just, I think, tag onto what Secretary Geurts says. You know, when you make balancing acts with the budget, one thing that Admiral Conn and I have agreed to is we are going to fill our readiness accounts to the max extent right off the bat, the max extent executable for that particular year because readiness is what the marines and sailors deserve on the deck.

The other thing that we look at is we look at our legacy systems, for us, the 53 Echo, the legacy Hornet, the risk that we take to make sure that they are funded and the readiness is up and they can maintain the capabilities, deployment cycles that we are asking them to do every day. We take risk at the speed in which our vendors can give us the aircraft that we ask for and the speed at which we can bring on new technology. And the F-35 and the 53-K is just two of those examples where we need to ramp those in

and by 2030 be out of the 53 Echo and be out of the legacy Hornet. And so that is the balancing acts we do each year with the budget.

Senator PERDUE. Senator Hirono?

Senator HIRONO. Just a few more.

So, Mr. Secretary, are you saying that not refueling the Truman is because it did not meet the capability need in the future?

Secretary GEURTS. No, ma'am. I guess what I was saying was, as we discussed in the last hearing, we had to make decisions based on cost of maintaining legacy equipment versus opportunities to modernize. And the Truman is a quite capable aircraft carrier, survivable. As we mentioned, carriers will be a part of any future Navy as we see it. But it does have some limitations and it does not have some of the growth potential that the Ford class gives us. And so that was an area where we consciously took some risk to enable us to move towards a 2.0.

Senator HIRONO. I think a lot of us—and maybe I am just speaking for myself and possibly Senator Wicker. We have concerns about not refueling the Truman. That is a major asset as far as I can see. So further discussions probably will occur along those lines.

Secretary GEURTS. Yes, ma'am.

Senator HIRONO. Admiral Winter, the head of the F-35 Joint Program Office, JPO, laid out a strategy to modernize the F-35 by transitioning the F-35 software to an open systems architecture with new capabilities being released every 6 months. That is a really fast pace. I do worry about whether the software will be adequately tested and whether aircrews will be adequately trained.

So for Admiral Conn, is the F-35 modernization program that I just talked about on the correct path with going to an open system with such speed with which we are going to change the software?

Rear Admiral CONN. On the right path, yes. If I figure from a deployment perspective, aircrew, our training in that aircraft to go on deployment, there is a certain time when you chalk the line, depending on how complex that change may be where you do not go on deployment with it because if you cannot train to it, you are not going to be able to execute those capabilities. But having that potential to update on that periodicity is interesting.

Now, I do not think all these 6 months you get a major change every time, and so you put out a major and then a fix and then a major and a fix. But I just reiterate whatever the cycle is, you have to be able to train to the capabilities that come with that upgrade before you deploy.

Secretary GEURTS. Yes, ma'am. As you know, on our submarine force—it is probably our most mature—I am doing rolling software and hardware updates as the planning battle rhythm. We have learned some good lessons in terms of the right speed for that. And so I would say having the software fixed and choosing to deploy it in the aircraft are two different decisions.

And so I fully support their ability to continue to get the software upgraded. It is a conversation with the operational commanders on when do you actually put that into deploy the aircraft and fully support Admiral Conn's we have to train before you put it out there in the fleet.

Rear Admiral CONN. The Secretary put it more eloquently than I did.

Senator HIRONO. I understood you. Do not worry, Admiral.

Thank you.

Senator PERDUE. Senator King?

General, I think we have exhausted our questions for the committee, but I am encouraged by the participation of the committee.

I want to give you just a piece of information to take back to your troops as we finish up this preparation for the NDAA, and that is this: There are five Members of this Subcommittee who are involved in the CR debacle. Senator Hirono and I are two different parties, but we are likeminded about that. Talk is cheap. But we do have 2 years—that did not happen by accident—that we actually proved that it can be DONE. Last year, we actually got the full defense authorization DONE and the defense appropriating DONE before we had the problem with funding the last 25 percent of our government.

But I want you to know and I want your troops to know that we are committed to try to fix this devastation. It has been here since 1974, and it is not going to be fixed easily. But it can be fixed.

We are staring down the barrel this year. We are halfway through the fiscal year, and we have not started the appropriating process at the level where we need to, have not even finished the authorization. Today we have 36 legislative days between now and 31 July. 36. And if we do not get it DONE by then, then all hands on deck because when we come back from the theoretic State break work period of August, there are only 10 work days left in September. So we know that is not realistic. So we are pushing all the buttons to try to get the House and the Senate to face up to this 31 July interim date.

Senator King?

Senator KING. Mr. Chairman, I completely agree with you, and I think we can do it. We proved last year that we could. I will leave it to you to deal with the other end of Pennsylvania Avenue because that is part of this discussion.

Senator PERDUE. No question. But I think we are all aligned on that. I think the Democratic Party, the Republican Party, and the White House are all aligned that CRs are bad.

But the problem is because of political gridlock here, sometimes we back into it as an easy release valves. I have never had a release valve in any budget I ever put together. I do not think you guys have many release valve. This is a release valve that Congress has, and we have got to stop it.

So I just made a comment, no promises, but just a comment for your troops because I know. I was on the Truman just this week and we had these conversations. I know what it does to morale. I understand it is devastating to all the pipeline and the supply chain for maintenance, as well as procurement.

So last comment. Thank you very much for your testimony, your service.

Good luck in your confirmation hearings, General.

And God bless you all. Thank you very much.

[Whereupon, at 11:36 a.m., the committee adjourned.]

[Questions for the record with answers supplied follow:]

## QUESTIONS SUBMITTED BY SENATOR ROGER F. WICKER

## NAVY ADVANCED HELICOPTER TRAINING SYSTEM (AHTS)

1. Senator WICKER. Secretary Geurts, in my role as Chairman of the Senate Commerce Committee, I am leading inquiries regarding aircraft safety standards and certification processes as a result of recent 737 MAX 8 accidents. FAA's safety and certification standards can be arduous and cumbersome, but are established to protect the public and assure the U.S. national airspace remains the safest and most efficient in the world. As such, I am encouraged that the Navy's Advanced Helicopter Training System (AHTS) acquisition strategy requires that the air vehicle be non-developmental, commercially derived, and already certified to meet modern day FAA Part 27 instrument flight rules (IFR) safety standards.

In the interest of assuring the safest training environment for the Navy, will you commit to this committee that the Navy will retain the current acquisition strategy requiring the TH-XX candidate aircraft to be FAA Part 27 IFR certified to current safety and certification standards in order to be eligible for contract award?

Secretary GEURTS. The Navy is committed to ensuring the TH-XX awardee's aircraft solution be FAA Part 27 IFR certified to current safety and certification standards. Consistent with this theme, the TH-XX solicitation establishes a requirement that each offeror included in the competitive range shall provide a copy of the FAA IFR Certification (FAA Form 8110-9) at time of final proposal submission. The failure of an offeror to provide a timely FAA IFR Certification will result in a non-compliant proposal and cause the offeror to be ineligible for award. The Navy does not intend to relax this minimum solicitation requirement.

2. Senator WICKER. Secretary Geurts, given the significant cost associated with sustaining the current TH-57 training helicopter fleet, and near-term risk the aging system poses to meeting pilot production requirements, it is critically important that the Navy field a replacement training helicopter without delay.

I ask that you brief my staff and the Armed Services committee staff on the TH-XX acquisition strategy and timeline, and make us aware of any significant changes to the acquisition strategy or schedule throughout the evaluation and contracting process.

Secretary GEURTS. The Department of the Navy briefed the Senate Armed Services Committee Professional Staff earlier this year on the AHTS program including the acquisition strategy and schedule. We would be pleased to offer the same briefing to your staff. The TH-XX program continues steady progression towards meeting an aggressive timeline and has experienced no significant changes to the acquisition strategy or schedule. The Request for Proposal was released on-time, industry proposals were received on-time, and the program anticipates awarding the contract for TH-XX in the first quarter of fiscal year 2020, provided there is no continuing resolution (CR). As an fiscal year 2020 new start program, operating under a CR would impact the AHTS program's ability to award the contract.

## F-18 RADAR UPGRADE FUNDING

3. Senator WICKER. Lieutenant General Rudder, I am pleased to see that the US Marine Corps F-18 radars are being upgraded with new active electronically scanned array (AESA) technology. However, the funding line does not seem consistent with the stated fielding objective of September 2022. The President's Budget funds only 12 radars in fiscal year 2020 and extends the procurement beyond the FYDP. Given this funding plan, how will you meet the fiscal year 2022 fielding goal for all 98 aircraft?

Lieutenant General RUDDER. We agree that based on current information and updated requirements, the PB20 OSIP 21-00 FYDP procurement plan does not reflect our updated procurement plan. Since submitting the fiscal year 2020 budget request over a year ago, we have gained additional information on vendor production capability and capacity, and identified efficiencies in RDT&E. We also have a better understanding of the immediate need to rapidly upgrade the F/A-18's RADAR prior to Final Fit. Armed with this new information, we have raised the priority of this upgrade and identified funding within Marine Aviation to increase the number of RADARs purchased in fiscal year 2020. From here, we must continue to increase our procurement over future fiscal years in order to meet our Q4FY22 fielding goal. This capability is needed by our F/A-18 community and the Marine Corps to support the NDS against peer competitors.

## QUESTIONS SUBMITTED BY SENATOR RICHARD BLUMENTHAL

## CH-53K

4. Senator BLUMENTHAL. Lieutenant General Rudder, is there any heavy lift helicopter that has the capabilities of the CH-53K King Stallion? Are you confident that this program will deliver the capabilities the Marine Corps needs for the heavy lift mission?

Lieutenant General RUDDER. The CH-53K King Stallion will be capable of delivering the vertical Battalion Landing Team (BLT) at a range of 110NM from ship to objective. This 110NM metric has been established as the optimal range of our modern aviation platforms, such as the MV-22, the UH-1Y and the AH-1Z. Today's legacy CH-53E is limited in its ability to perform at this range. The enhancement in lift and range delivered by the CH-53K fully leverages the capability of the Aviation Combat Element (ACE) and thereby the entire Marine Air-Ground Task Force (MAGTF).

5. Senator BLUMENTHAL. Lieutenant General Rudder, I understand that the King Stallion has roughly 3 times the lift capability of the legacy CH-53E's. How will this game-changing upgrade transform the Marine Corp's operational capability on the battlefield?

Lieutenant General RUDDER. The CH-53K King Stallion will be capable of delivering the vertical Battalion Landing Team (BLT) at a range of 110NM from ship to objective. This capability is essential to ensure the Aviation Combat Element (ACE) takes advantage of other modern platforms designed, built, and delivered to operate at an optimized range of 110NM. The increase in lift and range delivered by the CH-53K will increase the range of lethality of the future MAGTF.

6. Senator BLUMENTHAL. Secretary Geurts, the fiscal year 2020 request for the CH-53K dropped from the planned 9 aircraft to 6 aircraft in the current budget. Given your urgent need for this aircraft, and that the industrial base does not react well to declines in production ramps for new programs, would it be beneficial to the Marine Corps if Congress were to authorize and appropriate 2 additional CH-53K's this year to maintain a consistent annual production rate?

Secretary GEURTS. Thank you for your interest. I support the President's Budget of six aircraft in fiscal year 2020, and believe this budget provides the best balance of delivering needed capability to the U.S. Marine Corps while ensuring we have an achievable production profile.

## COMBAT EQUIPMENT

7. Senator BLUMENTHAL. Secretary Geurts, can you provide any examples of improvements to flight gear and body armor you are fielding to improve fit and functionality for women?

Secretary GEURTS. The Department is constantly striving to improve the quality of our gear to ensure not only success on the battlefield, but more importantly survivability. We are working to lighten weight, improve mobility, and increase protection against direct fire and fragmentation effects for our Marines. Resultant changes benefit the entirety of the Marine Corps population but are particularly helpful to female Marines. The Enhanced Combat Helmet, for example, provided significantly increased protection without adding weight. System designs are also enabled by feedback during the development of requirements to improve fitting Personal Protective Equipment (PPE), Organizational Clothing and Individual Equipment (OCIE), and other product characteristics and functionality. Once a validated requirement has been established, the Marine Corps emphasizes direct feedback from Marines—male and female—in determining what qualities and features are most important to Marine combat effectiveness through user evaluations, surveys, and fit studies. The Marine Corps presents these requirements and desired features to commercial industry to find the most technologically advanced materials and designs in order to provide improved protection and mobility for all Marines. The Plate Carrier (PC) is the primary body armor system for the Marine Corps, replacing the heavier and bulkier Improved Modular Tactical Vest. This transition to the PC reduces the system weight by 5.5 lbs. over legacy PPE, and provides a better fit for female Marines. We are currently developing the PC Generation (Gen) III, which is less bulky, lighter in weight, and provides a smaller overall footprint than the current PC while maintaining the same soft armor coverage and protection level. The PC Gen III accommodates three new front/back plate sizes and a new side plate developed for shorter stature male and female Soldiers and Marines. PC Gen III is 25 percent lighter than the current PC while providing equal protection and greater mobility

compared to our current system. Also developed with female Marines in mind, our body armor lightweight plate program will provide additional scalability with sufficient protection against most threats and reduced hard armor burden on individual Marines, 14.9 to 8.7 lbs. (42 percent lighter). For load bearing equipment, the Marine Corps is developing the Pack Adjustment Modification (PAM) that will integrate with the current USMC Pack to provide better adjustability for varying torso lengths. The PAM includes a frame interface with adjustment, redesigned hip belt, and redesigned shoulder harness. All of these changes improve the overall fit, comfort, and ergonomics of the USMC Pack for our Marines.

8. Senator BLUMENTHAL. Secretary Geurts, a leading cause of injury among servicemembers is ill-fitting Personal Protective Equipment (PPE) and combat gear. Women disproportionately incur such injuries. What are you doing to ensure the next generation of combat equipment is better suited for women?

Secretary GEURTS. In 2013, the Marine Corps received the results of a comprehensive anthropometric survey of Marines conducted through the Army's Combat Capabilities Development Command Soldier Center. This survey incorporated 94 directly-measured dimensions, 39 derived dimensions and three-dimensional scans of 1,301 male and 620 female Marines. This effort provided the large body of data needed to inform the Marine Corps design and engineering needs, and is the basis of the physical measurements used to inform the design of PPE, OCIE, and clothing to support the individual Marine from small-statured (2nd percentile female) to large-statured (98th percentile male). The Marine Corps has a standing Improved Personal Protective Equipment System (IPPE) Integrated Product Team (IPT) to develop requirements for the next generation of PPE. The Army is an active participant in the IPPE IPT, and both Services continue to work hand-in-hand in research and development efforts for individual combat, PPE, OCIE, and uniforms, particularly with regard to female Marines and Soldiers. The Enhanced Combat Helmet, Plate Carrier Gen III, Lightweight Plate, and Pack Adjustment Modification as previously described are examples of improved fit, which will specifically benefit female Marines.

9. Senator BLUMENTHAL. Secretary Geurts, in the past, there have been issues with getting new equipment to our servicemembers prior to deployments so they deploy with the same equipment used in training before deployment. This is critical to preventing injuries and ensuring readiness. As you develop this equipment, how will the Marine Corps and Navy ensure the new equipment is available not only for deployments, but also while conducting pre-deployment training stateside?

Secretary GEURTS. The Marine Corps fields new weapon systems based upon the Commandant's Fielding Priorities. The fielding plans for new systems and equipment undergo a comprehensive and collaborative review process by the Deputy Commandants for Plans, Policy & Operations and Combat Development & Integration, and the Operating Forces (OPFORs) to ensure they meet the needs of the OPFORs and are informed by the current operational tempo and the requirements of our deployed forces. As examples, the Joint Light Tactical Vehicle is being fielded to the School of Infantry before fielding to the Marine Expeditionary Forces to facilitate early training. In response to an urgent need, the Networking On-The-Move-Airborne Increment 2 was fielded directly to the Special Purpose Marine Air Ground Task Force-Crisis Response.

#### MARINE CORPS FUTURE MISSION

10. Senator BLUMENTHAL. Lieutenant General Berger, what strategic advantage does MARSOC provide to the Geographic Combatant Commanders that we would be lost if the Raiders (MARSOC) were disbanded?

Lieutenant General BERGER. Operationally, I would defer to SOCOM and the Geographic Combatant Commands to answer with details on this issue, but would note that Raiders fill approximately 10 percent of their assigned missions. From a man, train and equip perspective, MARSOC forward deployed forces bring an organic and fully integrated capability for operations and all-source intelligence fusion at the lowest levels that allows a comprehensive and holistic approach to problem solving in all environments to effectively conduct the whole spectrum of special operations. These capabilities are extremely effective operating against both Violent Extremist Organization (VEO) networks, as well as near peer competitors. These capabilities can be tailored based on the anticipated missions, but the force can be rapidly altered and specifically organized and trained as situations and mission sets evolve. Further, bringing with them their base culture as Marines, Raiders find a way to be highly successful and effective in what are often ambiguous environments. De-

mand for their integrated capabilities and expertise in these strategic impact operations continues to increase. From an operational perspective, Raiders have invariably gravitated toward the highest priority campaign activities within INDO PACOM, CENTCOM, and AFRICOM—the three regions comprising MARSOC’s current regional orientation. Efforts in these three regions have helped shape and support larger Joint Force efforts and advance Service-level opportunities for integration and interoperability in support of both the Counter VEO mission as well as contributing to great power competition. We can address further specific operational details of MARSOC’s current missions via classified medium if desired.

11. Senator BLUMENTHAL. Lieutenant General Berger, how do you see MARSOC’s role in great power competition and the National Defense Strategy?

Lieutenant General BERGER. Understanding that SOF is not designed to go toe-to-toe with large Armies, there are many ways MARSOC can support, before and during, potential conflict with near peer competitors. MARSOC forward deployed forces bring an organic and fully integrated capability for operations and all-source intelligence fusion at the lowest levels that allows a comprehensive and holistic approach to problem solving in all environments to effectively conduct the whole spectrum of special operations. These capabilities can be tailored based on the anticipated missions, but the force can be rapidly altered and specifically organized and trained as situations and mission sets evolve. As such, MARSOC can give a high degree of flexibility to the SOCOM Commander for the employment against specific mission sets, including in the great power competition cited in the NDS. Specifically: 1. MARSOC, along with the greater SOF enterprise, bridges the gap between covert capabilities from the interagency and the larger conventional forces. 2. MARSOC enables a deep understanding of the operational environment across the interconnected network of transregional threats at all levels of warfare against global, regional, and local competitors. 3. Raiders are specifically educated and trained to work with indigenous partners. 4. MARSOC, and SOF writ large, provides specialized unilateral capabilities not easily replicable by conventional or other agencies to deter, counter, and defeat global or regional powers. 5. MARSOC provides a creative and adaptable perspective and culture to the joint force to understand and resolve complex, dynamic, and uncertain challenges.

F-35

12. Senator BLUMENTHAL. Secretary Geurts, does the Department of the Navy remain committed to fully support procurement of the F-35B and F-35C until the current program of record is complete for 200 aircraft?

Secretary GEURTS. Yes, the Department of the Navy remains fully committed to support procurement of the F-35B and F-35C until the Program of Record is achieved. The President’s fiscal year 2020 budget request rebalances the Marine Corps aviation portfolio, deferring several F-35B aircraft into future LRIP contracts in order to balance concurrency management while taking advantage of emerging future technologies. The Marine Corps increased its procurement of F-35Cs over the FYDP to 28 F-35Cs (up from 19 in the fiscal year 2019 request) to ensure the service would be able to transition its F-35C squadrons on schedule. This decision provides the Service flexibility as it continues to determine the best mix of tactical aircraft as operational requirements develop and change. The Navy, in the fiscal year 2020 request, increased the F-35C procurement quantity over the fiscal year 2019 submission by one additional aircraft. With just over 100 F-35Bs and F-35Cs delivered to-date, continuing to deliver the transformational capability provided by the F-35 to our Navy and Marine Corps front-line forces as soon as possible remains a top priority.

13. Senator BLUMENTHAL. Lieutenant General Rudder, could you describe in some detail the enhanced capabilities the F-35B provided on this recent combat deployment compared to the AV-8 Harrier it replaced?

Lieutenant General RUDDER. Marine Fighter Attack Squadron 211 (VMFA-211) returned this Spring from a deployment with the 13th MEU, executing missions in three different theaters, flying 173 combat sorties for 1,205 combat flight hours, and dropping over 75,500 pounds of ordnance in combat—all with an average mission capable readiness rate of 72 percent. The operations were conducted with little interference from adversary fighters or indications from air or ground assets. The F-35s were able to support multiple combatant commanders while deployed in complex operating environments and gave those commanders more versatility in their assigned missions due to their 5th Generation Capabilities.

14. Senator BLUMENTHAL. Admiral Conn, in February, the Navy declared Initial Operational Capability for the F-35C with a planned deployment in 2 years, bringing a 5th Generation tactical air capability to the Carrier fleet for the first time. What attributes do you currently think are most important to maintain lethality and survivability in the next 10 to 20 years?

Admiral CONN. Creating and maintaining battlespace awareness across all platforms, not just 5th generation tactical aircraft, is the most important capability to maintain lethality and survivability in the next 10 to 20 years. There isn't a singular platform able to maintain situational awareness to all spectrums (infrared, electro-optical, or radio-frequency); therefore, all platforms must share information to create a lethal and survivable kill chain. We must continue stable investments in long range, net-centric weapons which are able to attack fixed and moving targets on land and sea while maintaining stand-off ranges to near peer threats. These weapons need commonality across several platforms to remain economically feasible and must be survivable in the future fight.

15. Senator BLUMENTHAL. Lieutenant General Rudder, with the Air Force's addition of 4th Gen F-15EX's to this year's budget, we have learned that this is at the directive of the Secretary of Defense to the services to pursue a mix of 4th and 5th Gen aircraft for future buys. Does the Marine Corps plan to purchase any additional 4th Gen Tactical Aircraft like the F/A-18E Super Hornet?

Lieutenant General RUDDER. We conducted an in-depth analysis in the fall of 2018 prior to submission of the PB-20 budget working with OSD to explore this as a potential option for the Marine Corps. Our analysis demonstrated that the Marine Corps is on the right path with an all 5th Generation force. An investment in a new 4th generation platform would not meet the warfighting requirements to support the National Defense Strategy and would in fact be more expensive for the Service both in terms of dollars and manpower for a new aircraft type in the near and long term. A mix of F-35B and F-35C aircraft allows for a single training pipeline, supply system, and maintenance support structure.

