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HEARING

ON

NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 2020

AND

OVERSIGHT OF PREVIOUSLY AUTHORIZED PROGRAMS

BEFORE THE

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES

ONE HUNDRED SIXTEENTH CONGRESS

FIRST SESSION

SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES HEARING

ON

NAVY AND MARINE CORPS TACTICAL AVIATION AND GROUND MODERNIZATION

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NAVY AND MARINE CORPS TACTICAL AVIATION AND GROUND MODERNIZATION

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES,
Washington, DC, Thursday, April 4, 2019.

The subcommittee met, pursuant to call, at 9:02 a.m., in room 2118, Rayburn House Office Building, Hon. Donald Norcross (chairman of the subcommittee) presiding.

OPENING STATEMENT OF HON. DONALD NORCROSS, A REPRESENTATIVE FROM NEW JERSEY, CHAIRMAN, SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

Mr. NORCROSS. Good morning. Excuse my voice, but the hearing will come to order.

The Tactical Air and Land Forces Subcommittee meets today, our first hearing of the 116th Congress. We're going to review the Navy and Marine Corps tactical aviation and ground modernization programs for this fiscal year.

I would like to thank the members for working with us to change the time. We are going to try to get the bulk of this hearing in before votes come somewhere around 10:00 to 10:30.

The subcommittee has been busy over the last couple weeks attending briefings with military departments to learn and discuss mission areas and programs related to the jurisdiction of this subcommittee. The briefings have worked well. I think we have learned quite a bit. But that is the foundation of oversight and what we are going to do this Congress.

We have a number of witnesses with us today, starting with Vice Admiral Mat Winter, Program Executive Officer for the F–35 joint program—you are a very popular person quite a bit right now; Rear Admiral Scott Conn, Director of Air Warfare for the Chief of Naval Operations; Lieutenant General Steve Rudder, Deputy Commandant for Aviation for the Marine Corps; Lieutenant General David Berger, Commanding General of the Marine Corps Combat Development Command and Deputy Commandant for Combat Development and Integration; Daniel Nega—did I get that right?

Mr. NEGA. That is close.

Mr. NORCROSS. It is close? Deputy Assistant Secretary for Navy for Research, Development, and Acquisition for Aviation Programs; and Mr. Jimmy Smith, Deputy Assistant Secretary for the Navy for Research, Development, and Acquisition, Expeditionary Programs and Logistics Management. Yeah.

First of all, General Berger, congratulations, before we get into our formal remarks, for your nomination as being the next Com-

mandant. Your shoulders will be heavy, but you stand in a long line of great leaders, and I am sure you will do us well and serve the country well.

Also, I want to thank the other witnesses for your service for certainly everything that goes on.

We have quite a lengthy statement that I am going to put into the record, but in order to save some time, I am going to pare it down a little bit, because we have quite a bit, and we want to make sure we get it finished before we move into that.

But today we are talking about the Navy and Marine Corps plan to face a modern force ready for challenges posed by near-peer adversaries taking shape. And this is a change based on the National Defense Strategy and the changes that we are going through. Yet we have been in a road that was taking us down in an area that was very different from the national strategy we have now.

There are a number of issues we are going to be dealing with today, the F–35 being one of them; our rotor fleet, certainly a number of issues there; what and which variants are going to go on with the F–35; Joint Light Tactical Vehicle. The list goes on and on.

But, at this point, what I want to do is turn it over to my ranking member for her opening remarks, Mrs. Hartzler.

Good to see you this morning.

[The prepared statement of Mr. Norcross can be found in the Appendix on page 35.]

STATEMENT OF HON. VICKY HARTZLER, A REPRESENTATIVE FROM MISSOURI, RANKING MEMBER, SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

Mrs. HARTZLER. Good to see you, Mr. Chairman. And since this is our first official hearing, even though we have had several briefings, the first hearing of the 116th Congress, I want to congratulate you on being chairman of this committee. And I look forward to working with you. We have a strong tradition of working in bipartisan fashion, and we look forward to carrying that out and doing good things for our country. So congratulations.

And thank you, gentlemen, for being here today.

As you know, we are here to talk about our Navy modernization programs. It is important because years of continuous combat operations and deferred modernization created a crisis in the military readiness in both capability and capacity. And it will take many years of increased defense budgets representing real growth in order to fully address this crisis.

We cannot afford to go backwards. This level of spending in the fiscal year 2020 budget request is the minimum needed to continue to repair our military and defend the country.

The chairman covered several of the major areas. I briefly want to touch on a couple that I hope that you will address today.

First, regarding physiological episodes in the aircraft, I am encouraged by the progress being made as well as the amount of resources requested by the Navy in fiscal year 2020, approximately $278 million, in the areas of upgrading the aircraft, changes in aircrew education and training, improved maintenance practices, and

bringing in the medical community to better understand the human dynamic.

This needs to remain a top priority. And today's hearing is a good opportunity for the witnesses to update us on the Navy's efforts to mitigate these events in F–18 and T–45 aircraft.

Second, regarding the F–35 Joint Strike Fighter program, the chairman mentioned this as a focus. And I would also add that we need to better understand what actions are being taken now in this budget request to lower operation and sustainment costs, to include ramping up organic depot capability, improving the Autonomic Logistics Information System, or ALIS, and improving the time associated for long-lead parts.

The Block 4 modernization program, which includes hardware and software, has 66 approved requirements associated with it. The current estimated cost to complete the initial program is approximately $10 billion.

The Director of Operational Test and Evaluation has indicated the schedule could be viewed as high-risk due to the large amount of planned capabilities to be delivered in 6-month increments.

Given the scope and complexity of this effort, we would like to hear and expect, Admiral Winter, you could provide us with additional details on the challenges and risks associated with this critical program.

And, lastly, we would expect to get an update on current efforts to improve reliability and maintainability of the aircraft, in particular for these aircraft fielded to operational squadrons.

So a few things there.

And there is no doubt that the capabilities the F–35 brings to the battlefield against advanced threats by peer competitors is needed to meet the goals and objectives of the National Defense Strategy. However, we all share concerns about rising F–35 operations and support costs affecting long-term affordability, which could result in lower procurement quantities in the out-years.

And representing Whiteman Air Force Base, with the B–2 bomber, I know up close and personal what that can look like, having a large amount of aircraft originally scheduled and then ending up with—now we have 20 aircraft.

So the F–35 Joint Program Office, along with the military services, appear to be very focused on reducing these costs. And we look forward to working with each of you and industry in a collaborative manner to reach your objectives.

And, lastly, regarding aviation readiness and strike fighter inventories, it is my understanding that the Navy continues to take risk in its management of the strike fighter inventory and has an identified shortfall of 54 aircraft, which amounts to one carrier air wing. We need to better understand what impacts this has to overall readiness and what we can do to improve the situation from a modernization standpoint.

So I thank the chairman for organizing this hearing, and I yield back the balance of my time.

Mr. NORCROSS. Thank you, Mrs. Hartzler.

And cost is obviously a major consideration. Obviously, you have to weigh the risk, and that is your job, and a very difficult one at that. But we are also looking at supply chain. And if you just open

up the newspaper or look online, Turkey and part of that supply chain for the F–35 is going to factor in quite a bit. And we expect to hear about that today.

And we have had a little change of the lineup, as I understand it, but we are going to start with Mr. Nega. And we are going to start with you, and then we will work down the line with Admiral Winter. And some of your testimony is going to be presented jointly.

Good morning. How are you?

STATEMENT OF DANIEL L. NEGA, DEPUTY ASSISTANT SECRETARY OF THE NAVY FOR RESEARCH, DEVELOPMENT, AND ACQUISITION FOR AIR; ACCOMPANIED BY LTGEN STEVEN R. RUDDER, USMC, DEPUTY COMMANDANT FOR AVIATION, AND RADM SCOTT D. CONN, USN, DIRECTOR, AIR WARFARE, OFFICE OF THE CHIEF OF NAVAL OPERATIONS (OPNAV N98)

Mr. NEGA. Good morning. Thank you.

Chairman Norcross, Ranking Member Hartzler, and distinguished subcommittee members, thank you for the opportunity to appear before you today to update you on the Department's fiscal year 2020 naval aviation programs.

I am joined today by Lieutenant General Steven Rudder, Deputy Commandant for Aviation, and Rear Admiral Scott Conn, Director of Air Warfare.

We would like to thank Congress for your support for the timely enactment of the fiscal year 2019 budget. Receipt of the fiscal year 2019 authorization and appropriation without a CR [continuing resolution] increased our acquisition efficiency.

As GAO [Government Accountability Office] reported to you in February of 2018, continuing resolutions result in uncertainty, complicated operations, and inefficiencies. This year's timely enactment enabled the Naval Air Systems Command to obligate 41 percent of its O&M [operation and maintenance] budget, three times the rate compared to fiscal year 2018 to date; obligate 71 percent of planned depot inductions, five times the rate of fiscal year 2018; and obligate 29 percent of fleet support team funding, twice the rate of fiscal year 2018.

The teams were also able to clear the backlog of contracting actions and, most importantly, improved our ability to support the fleet.

Our fiscal year 2020 budget request aligns to the personnel, capabilities, and processes needed to implement the Navy-Marine Corps contribution to the National Defense Strategy, where great power competition is the central challenge to the prosperity and security of the United States.

A resurgent Russia and rapidly growing and more aggressive China continue their aims to displace American influence in critical regions around the globe. To regain and expand our competitive advantage, it is imperative that we adapt to this changed national security environment and do so with both a sense of urgency and enduring resolve.

Great power competition against capable challengers will not fade over one or two budget cycles. We need your support over the long run as we face risks to our economic, technological, and na-

tional security. To do this requires the right balance of readiness, capability, and capacity underpinned by stable and predictable budgets.

The lethality which naval aviation brings to bear in support of our Nation's interests is at the forefront of this challenge. As such, we request your continued support for both our ongoing readiness initiatives and the investment in the development of new and advanced capabilities.

Mr. Chairman, our fiscal year 2020 investments are focused, balanced, and prioritized to deliver a ready, capable sea-based and expeditionary force. To better enable the best use of our requested investments, we continue to transform our business practices and evolve our acquisition and contracting strategies to maximize the output of every taxpayer dollar.

Leveraging the vision and acquisition authorities provided by the Congress, we are working to become more agile to deliver relevant capability at speed and at scale. To improve readiness, we are leveraging commercial toolsets and best practices by making fundamental changes to the processes by which we plan and execute naval aviation sustainment activities.

We thank you for the strong support this subcommittee has always provided to 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 Mr. Nega, General Rudder, and Admiral Conn can be found in the Appendix on page 38.]

Mr. NORCROSS. Thank you.

Admiral Winter.

STATEMENT OF VADM MATHIAS W. WINTER, USN, PROGRAM EXECUTIVE OFFICER, F–35 LIGHTNING II PROGRAM

Admiral WINTER. Good morning, Chairman Norcross, Ranking Member Hartzler, and the distinguished members of the subcommittee. It is a distinct honor and pleasure to appear before you today with my esteemed colleagues to discuss the Department of the Navy's tactical aircraft modernization and the critical role that the F–35 plays in that as well as enabling our Department's National Defense Strategy.

With advanced fifth-generation capabilities being delivered through the implementation of agile development technologies and methodologies, the F–35 has turned the corner and now embodies both fleet modernization and acquisition innovation for our U.S. services, our eight international partners, and our four foreign military sales teammates.

I am appreciative of your oversight, insight, support, and interest of the F–35 and look forward to continuing the discussions we began last month at our tactical aircraft familiarization panel.

Since I last testified in front of this committee in March of 2018, the F–35 Joint Program Office has made tremendous progress across our three lines of effort of development, production, and sustainment while continuing to enable successful operations for our U.S. services and international partners.

Specifically, we completed our system development and demonstration flight test program; we delivered the full Block 3F capa-

bility with stable hardware and software; we made solid progress in fixing our ALIS maintenance system; and we began initial operational test and evaluation.

In production, we definitized the Lot 11 production contract with an $89 million F–35A, $115 million B, and a $107 million C—all over 5–10 percent decrease over the previous production lot.

We increased our U.S. services' depot repair capacities in the United States. We activated the Italian maintenance, repair, overhaul, and upgrade facility. And we established a credible cost-per-flying-hour metric to get our hands around the ownership and operational cost of the F–35.

We supported several U.S. Air Force theater support deployment packages. We conducted the first-ever F–35 Charlie air wing integrated flight operations on the USS *Abraham Lincoln.* We successfully supported the United States Marine Corps first deployments on the USS *Wasp* and *Essex,* to include the first-ever combat operations of the F–35B by the United States Marine Corps.

And we supported numerous declarations of initial operational capabilities by our U.S. Navy, Italian Navy and Air Force, Royal Air Force and Navy, and, just recently, the Japanese Air Self-Defense Force, just to name a few accomplishments.

As we look forward, as the program embraces an agile framework for continuous capability development and delivery, C2D2, to ensure we can deliver the Block 4 warfighting capabilities, as we ramp up the full-rate production, with plans to deliver 131 aircraft this year, and as we get ready to achieve the 80 percent mission-capable rates for our combat fleets, the F–35 is now on track to be affordable and meet the needs of today's and tomorrow's warfighter.

Of course—you have heard me say this before—F–35 is more than an airplane, and as you will hear today, the modernization of F–35 is not limited to hardware alone. Rather, it is a combination of software and hardware. And the ability to collect, analyze, and share that data is a force multiplier that enhances all assets in the battlespace.

The F–35 is truly the quarterback of the joint force. And with stealth technology, advanced sensors, and weapons capacity and range, it is the most lethal, survivable, connected, and interoperable fighter aircraft ever built.

For the Department of the Navy, the convergence of stealth aviation and maritime capabilities found within the F–35B and C gives the United States Navy and Marine Corps combat attack flexibility and improves their ability to truly fight sophisticated enemy air defenses. This allows aircraft carriers and amphibious assault ships to maneuver and engage threats in highly contested environments.

Today, with over 395 aircraft fielded, the F–35 is more affordable and lethal than ever before. However, I am not satisfied, and we can't be satisfied. We have to continue. We have to tackle the challenges in front of us for the repair times, the spare parts postures, our production line flows, and the labor skills to ensure that we can reduce overall ownership costs.

In cooperation with industry, we have established initiatives and are tackling these challenges with a clear mandate to continue to drive affordability, quality, and reliability across the entire enter-

prise to meet that 80 percent mission-capability rate, to drive below an $80 million F–35 unit price, and to truly obtain the $25,000-cost-per-flying-hour target in 2025.

Our President's budget fiscal year 2020 requests the resources necessary to achieve these goals and funds the continuation of our innovative agile development of critical Block 4 capabilities, supports the production of 78 F–35 air systems for our U.S. services, and ensures the required investments to operate and sustain over 660 F–35 air systems that are planned to be fielded at 22 bases and 7 sea-based locations by the end of fiscal year 2020.

On behalf of the men and women of the F–35 enterprise, you have my continued commitment to provide the accountability and transparency the taxpayer demands and the affordable, game-changing air system the warfighter needs.

I thank you again for the opportunity to discuss the F–35 program and its role in the Department of the Navy's modernization and look forward to your questions.

Thank you, Mr. Chairman.

[The prepared statement of Admiral Winter can be found in the Appendix on page 68.]

Mr. NORCROSS. Thank you.

Mr. Smith.

STATEMENT OF JIMMY D. SMITH, DEPUTY ASSISTANT SECRETARY OF THE NAVY FOR RESEARCH, DEVELOPMENT, AND ACQUISITION FOR EXPEDITIONARY PROGRAMS AND LOGISTICS MANAGEMENT; ACCOMPANIED BY LTGEN DAVID H. BERGER, USMC, COMMANDING GENERAL, MARINE CORPS COMBAT DEVELOPMENT COMMAND, AND DEPUTY COMMANDANT FOR COMBAT DEVELOPMENT AND INTEGRATION

Mr. SMITH. Chairman Norcross, Ranking Member Hartzler, and distinguished subcommittee members, thank you for the opportunity to appear before you today to update you on the Department of Defense's 2020 Marine Corps expeditionary programs.

I am joined here today by Lieutenant General David H. Berger, Commanding General, Marine Corps Combat Development Command, and the Deputy Commandant for Combat Development and Integration. We look forward to your questions as we move through this this morning.

As stated by Secretary Spencer and Assistant Secretary Geurts during previous hearings, 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.

Additionally, in the 2018 National Defense Strategy, in order to retain and expand our competitive advantage, it is imperative that we proactively work to meet these challenges and do so with a sense of urgency through new operational concepts and modernizing, resulting in overmatch.

The Navy and the Marine Corps must remain ready at any time to respond to crisis and contingencies while simultaneously deterring adversaries' aggressions globally each and every day.

Competing with the peer threat is the theme of our fiscal year 2020 budget submission. It directly aligns to the Secretary of De-

fense's guidance to increase lethality, improve warfighter readiness, and achieve program balance.

In it, we prioritize investments so that our Marine Corps will evolve from today's 1.0 force to a near-term 1.1 modernized force that leverages select existing programs to achieve warfighting concepts, and ultimately a 2.0 future force with revolutionary capabilities required to create that competitive overmatch.

In it, we have prioritized modernization programs that address command and control in a degraded environment, long-range and precision fires, operations in the information environment, air defense, protected mobility, enhanced maneuver, and logistics.

These modernization efforts represent roughly 30 percent of the total PB20 [President's budget request for fiscal year 2020] budget submission. They are synchronized with the Secretary of Defense's National Strategy, the Chairman's Capstone Concept for Joint Operations, and the Navy's distributed maritime operations concepts and our expeditionary advanced base operations concepts.

Through your help, we will continue the hard work to rebuild our readiness and modernize our Corps to maintain our competitive advantage against rising competitors. But we will need your help to do so.

Again, thank you for the opportunity to testify before this committee today, and we look forward to your questions.

[The joint prepared statement of Mr. Smith and General Berger can be found in the Appendix on page 91.]

Mr. NORCROSS. Thank you for each of your testimonies. And we will get right into questions and make sure our members have a chance.

Admiral Conn, General Rudder, let's get right into the F–35, and let's talk about fourth-generation versus fifth-generation aircraft, the best mix. Over the course of the last few years, there has been a tremendous amount of discussion on fifth-generation and how important that was moving forward. Yet we are—legacy issues, primarily the fourth-generation.

Where do you see that mix today? And in light of some of the changes in the numbers of the F–35s being requested, what mix do you see that going to as a percentage in numbers?

General RUDDER. Thank you, Mr. Chairman.

The Marine Corps is going to be a fourth-gen/fifth-generation mix until 2030. And we decided to stay with our legacy Hornets and skip right into the fifth-generation.

We are going with a B and C mix, because we still have a commitment to the Navy to not only deploy on carriers but also do expeditionary operations. So we are going to buy—as you saw, we rebalanced this year with more C's, just really more to catch up.

We have begun training our first F–35C squadron up in Lemoore, and we will be the second carrier deployment with the United States Navy with the F–35Cs. And we will continue to support them with that as well. So that is the B/C mix.

With the fourth-gen/fifth-gen, our strategy has always been: Go from EA–6B to AV–8B, to F–18, down to one type aircraft. And what that means is for our small 18 squadrons, expeditionary squadrons, both B and C, we will be able to mix pilots back and

forth between the B and C, one simulator, one maintainer, one supply account. And that creates efficiency for us.

For us to stay with a fourth-gen, we have to keep a whole other institution for a fourth-gen fighter. So for fifth-gen for us, one for the business model, one type aircraft is efficient and affordable.

On the other side of things, as we——

Mr. NORCROSS. Let me just drill down a little bit. So are you saying only fifth-generation, 100 percent, when you are deploying those?

General RUDDER. After 2030, we will be——

Mr. NORCROSS. Oh, after 2030. How about between now and then?

General RUDDER. We will continue to be a fourth-gen and fifth-gen fleet out until 2030, with both Harriers going to probably 2028 and F–18s going to 2030, 2031.

Mr. NORCROSS. So, as a percentage, you are what now?

General RUDDER. We are probably about 80/20 today, and we will be 80/20 around the 2028 timeframe, but then 100 percent fifth-gen by 2030 is our goal.

Mr. NORCROSS. Okay. I am sorry to interrupt. You can finish.

General RUDDER. I think the last thing I will just say is, as we look at, for us, the Marine Corps being an inside force, and we are deployed forward, we are deployed forward, as we are today, even after we brought our first combat deployment back today, we have 10 F–35Bs on the USS *Wasp,* and they are steaming around various parts of Asia as we speak right now. I think if you look at the competition from 2025 into 2030, fifth-gen for us, as an inside force, will be—it will be required to win.

Admiral CONN. Thank you for that question, sir.

Much like the Marine Corps, we will not attain a 50/50 mix until about 2030 based on the existing ramps that we have. Any additional resources——

Mr. NORCROSS. And the ramps were the ones as——

Admiral CONN. As reflected in PB20.

Mr. NORCROSS. Thank you.

Admiral CONN. Any additional resources that would be available from an F–35 perspective would provide us some buffer to meet our transition schedule as we get transition squadrons from Super Hornets into the Joint Strike Fighter.

Right now, first Navy squadron IOC'd [initial operating capability] the VFA–147 in February. Next squadron transition as part of TACAIR [tactical air] integration will be a Marine Corps. And it goes back to a Navy and continues to alternate through 2026 or 2027.

In terms from a warfighting perspective—because that is really what this discussion should be about—the 50/50 mix through 2030, with a Block 3 Super Hornet and with F–35s out there and with E–2Ds out there and with E–18G Growlers out and with MQ–25 out there, I don't look at any particular aircraft capability; I look at the weapons system that flies off that carrier as a carrier air wing—because that is how we are going to fight—and what is the most lethality can it provide that is affordable and executable in the near term, and that is what our plan is.

Anything beyond the Block 3 Super Hornet is a next-generation air dominance discussion in terms of what is going to replace that aircraft. That AOA [analysis of alternatives] will be complete this spring. The final report will come out this summer. And that will inform future choices reflected in future budget cycles, in terms of what do we need to do to get after the lethality that we need at a cost that we can afford.

Mr. NORCROSS. Thank you. So, Admiral Winter, let's start talking about the supply chain for the F–35. The numbers that were originally planned were tremendously behind. We are not even close to that. But the ones that were part of last year's budget going into this year's budget have dropped a little bit.

What does that do to your supply chain? Is that giving you the opportunity to get caught up with some of the problem areas of supply?

Admiral WINTER. Thank you for that question, Mr. Chairman.

The slight perturbations of U.S. service quantities across the recent years are really within what I call the margin of error for our growth phase. We are going from 66 aircraft that we delivered in 2017. We delivered 91 last year. We plan to deliver 131 this year. And we will be at 167 by 2020.

The slight inputs and decreases and increases are not having a drastic input on the purchase order demand on our supply chain because we are also putting a big demand signal on them for spare parts for sustainment.

And so, as we look at the complete supply chain demand signal, the production and sustainment balance, we would have to see reductions of quantity measured in 40 or 50 in 1 year, or increase, to really put a reduction of demand on our supply chain.

Mr. NORCROSS. So does that end up in the delivery schedule? There is a difference between the two. So the actual delivery, is that being impacted at all?

And the next thing we are going to want you to comment on, in the event that Turkey is no longer part of the supply team, how are you going to handle that?

Admiral WINTER. Yes, sir. So the first question and the impact on the supply chain, what we are seeing right now is, with the current demand on the 3,000 suppliers that provide parts to the production line and to our sustainment enterprise for spare parts, they are struggling with the demand signal on them, because they are producing parts for the production line, they are producing parts for spare parts for sustainment, and we still have them repairing their part for the ones that are breaking now that we have 395 aircraft deployed.

So the strategy here is to take that demand signal of repairing the parts off of our industry and put it into our depots, our organic depots around the country, our fleet readiness centers and air logistics centers, so that our industry supply chain can truly focus on what they do best, which is generating new parts.

What we are seeing is that the ramp-up and the demand signal lagged from both Pratt & Whitney and Lockheed Martin to get the supply chain up the ramp from 66 to 91 to 131 to 167. And so we are starting to turn that corner, but we are still lagging.

Right now, my production line at Lockheed Martin Fort Worth has on the average about 200 parts that are late every month. What that does is that pushes work down the production line, and we call it traveled work. Instead of stopping and waiting for the part to show up, we move it to the next station, and then they do that work at the next station. So there is a lot of extra management and extra touch and extra work that has to occur that is driving that price up and not necessarily seen by flow of the production line.

The other part—right now, Turkey and my other seven partners are all part of the supply chain, and they all have roughly a percentage of supply chain demand commensurate with the number of aircraft that they are procuring. Turkey is about 6 percent, 6 to 7 percent, of our F–35 supply chain.

Right now, there has been no disruption to the supply chain from any of my partners, to include the United States. And the flow we call the work in progress, WIP, that is flowing from Turkey, from my other partners, continues to flow to not only Fort Worth but to Cameri in Italy and Nagoya in Japan. Those are our three production lines.

What we need to make sure is that any disruption to the supply chain, no matter where it comes from, we are putting in place the appropriate mitigation steps to mitigate potential disruption of the supply chain.

I will stop there, sir, to see if I answered your question.

Mr. NORCROSS. You have. And I have a number of other questions, but I want to give the ranking member an opportunity.

Mrs. Hartzler.

Mrs. HARTZLER. Thank you. Thank you very much.

So you are putting in place the mitigation efforts, but at this point, if Turkey were to stop providing that 6 to 7 percent supply chain, where would you be at?

Admiral WINTER. So, ma'am, from any supply chain provider, we are between—we can do it in terms of aircraft or in terms of time. The evaluation of Turkey stopping would be between a 50- and 75-airplane impact over a 2-year period. From a timeline, we would see within 45 to 90 days an impact of the slowing down or stopping of those parts to the three production lines.

Mrs. HARTZLER. Okay. Thank you.

I want to shift to physiological episodes [PEs], the F/A–18.

So, Admiral Winter, I will start with you. Should we be worried that, over time, as we add more and more capability to the F–35, that at some point the air handling system of that plane won't be able to keep up?

And what have we learned from the current F–18 situation to perhaps get out ahead of this so similar problems in the future don't happen with the Navy and the Marine Corps F–35s?

Admiral WINTER. Yes, ma'am. Thank you for that question.

The F–35 enterprise has been part of the entire Department of Navy and the Air Force Physiological Episode Team, the PET team, and has been there since day one, understanding the causal factors, the barriers, and the solutions not only from an operational perspective but, more importantly, technical.

The F–35 life support system already incorporates the lessons learned from F–22, F–18, and other—F–15 and F–16 from an initial design element in the middle of 2004 to 2005. F–35 has experienced, on average, the same or slightly less rate of physiological events that other aircraft have.

Our solution space there is working with the aeromedical community, just like our Department of the Navy folks, to do understanding the physiological events. But we have also incorporated three dedicated technical solutions to get ahead of any potential ramp of physiological episodes.

In that, our oxygen-generating system—we call it the onboard oxygen-generating system—it is pronounced "OBOGS"—we found that it was providing the appropriate concentration of oxygen to our pilots, but there was a variation in it that, if we reduced that variation, would eliminate a potential causal factor. So we are incorporating that new logic to our OBOGS.

There is a seat portion assembly—that is in the seat of the F–35—that senses cockpit pressure and other inputs and will immediately initiate the emergency oxygen system to the pilot if it senses that the decompression or the atmosphere within the cockpit requires that. It was too sensitive, so we have gone back and looked at that based upon pilot input, and we are doing a seat portion assembly upgrade.

And then, finally, we have incorporated a carbon monoxide—so a single CO [carbon monoxide]—catalytic filter that does higher-fidelity filtration of carbon monoxide, which the aeromedical community has determined is a first-order effect to physiological events.

So those are all in work and will be in as the production baseline for Lot 12 and are being retrofitted into our previous jets.

Thank you, ma'am.

Mrs. HARTZLER. Well, thank you. It sounds like you are really taking the lessons learned and incorporating those.

I was kind of concerned, though, when you said that they have the same rate of physiological episodes as the other aircraft, though, even with all of these changes. Are they already on there, or are you just incorporating them for the future models?

Admiral WINTER. So the OBOGS and the SPA, the seat portion assembly, is early in the next quarter. And the COCAT [carbon monoxide catalyst], the carbon monoxide, is early next year.

To your point about previous aircraft, what we are seeing from a physiological pilot population, more experienced pilots seem to have less incidents of physiological events. There is not a direct causal factor drawn by that. And so we are seeing our physiological events in our training aircraft over our operational aircraft, and they are the same design. Physiological events first-order effect is actual human being makeup as we go forward.

Thank you, ma'am.

Mrs. HARTZLER. I know it is a very complex issue and there is not one particular solution. And I appreciate your focus on trying to get a handle on this.

And let me turn to Admiral Conn.

I know you have been really focused on this as well. So can you kind of give some update on the numbers of reported PE incidents? Are they trending up or down? And can you describe for us how

the Navy gets feedback from the PE event investigations back to the crew members and the pilots who experience them?

Admiral CONN. Yes, ma'am. Thank you for the question.

First, I would say we have taken over 20,000 samples of air that is coming out of the OBOGS system, whether a T–45 or F–18, put it through the spectral analysis, and have determined that there is no contamination getting to that aviator. So we have ruled that out. All right? That is one.

Two, for our T–45, you asked for numbers, ma'am. In 2016, we had 35 incidents; 2017, 31 incidents. Last year, we had six. This year, thus far, this fiscal year, we have had one. So that is progress.

We have done it through straight-lining the pipes, if you will, that come off the engine that get to the OBOGS concentrator to provide constant flow, better flow to that piece of gear. And we have also increased flight idle RPM [revolutions per minute] by 1½ percent, again, to get better flow to that cockpit. And that is what is driving those numbers down.

For Hornets, it is different. You have A through D's and Super Hornets. And I have both numbers. I will talk to Super Hornet numbers.

The primary driver to PE events in the Super Hornet is cabin pressurization and fluctuations that we are seeing. The incidents we have had for the Super Hornet—that is E, F, and G, so we include the Growlers in this conversation—we had 87 incidents in 2016, 73 incidents in 2017, 65 incidents in 2018. Thus far this fiscal year, we have had 41. Any progress we have made has flattened out.

The good news is we know what we need to do in terms of using data analytics, working with Admiral Luchtman, who is leading the PEAT [Physiological Episodes Action Team] team at NAVAIR [Naval Air Systems Command]. Things like the primary bleed air regulator valve, secondary bleed air regulator valve—we can connect that those systems are driving PE events. Some of those are under contract and will start delivering this year. Others of those gear will start delivering in 2020, and we are going to install that on the airplane.

CPOMS [Cockpit Pressure and Oxygen Monitoring System], if you have heard about that, where it is the digital cabin altimeter, but it also measures the oxygen to be able to warn the aircrew, that is being installed this year and will continue being installed out through 2020 until we outfit the fleet.

So, from a PE side, we have ruled out contamination. We have had the engineering to address the T–45. It is in place, and we have driven down numbers. From a Super Hornet side, we have kind of flatlined on the cabin pressurization. But we know what we need to do, and we are getting at it, with respect to getting the items under contract, getting them in the aircraft. And until we do that—and we need the resources that we are requesting to do so—we are not going to make any significant change to these cabin pressurizations.

In terms of follow-on care, we have aviators that have numerous PEs or a couple PEs. We make sure that there is follow-on care and have identified the resources with our medical community, whether

it be in Portsmouth or out on the west coast, to make sure that they have access to the specialists they need for any chronic symptoms that they are seeing.

Mrs. HARTZLER. As far as the investigations, though, and getting that feedback back to the crew members and the pilots, how is that done?

Admiral CONN. Admiral Luchtman is on the road as I speak talking to aviators. He was down talking to T–45 folks earlier in the week. He engages with Oceana for our strike fighters. He goes out to Lemoore and provides feedback—honest, transparent, "this is what we are seeing." And I can tell you that for the young aviators down in CNATRA [Chief of Naval Air Training], they have complete confidence in the T–45 system now.

Mrs. HARTZLER. That is great. Well, appreciate all of your ongoing efforts. I look forward to hearing the results of these changes you make and how it impacts this, hopefully, in the future.

Thank you. I yield back.

Mr. NORCROSS. Thank you.

Mr. Carbajal.

Mr. CARBAJAL. Thank you, Mr. Chair.

Welcome to all the witnesses. And congratulations again, General Berger, on your nomination.

General Berger, the full-rate production decision for the Joint Light Tactical Vehicle, JLTV, has been delayed, apparently due to issues with the visibility and limitations on how weapons can be fired from the vehicle.

What is your assessment of the JLTV program status, current configuration, changes needed, and plans to resolve issues prior to a full-rate production decision?

General BERGER. Thank you, sir. The vehicle, as it is right now, meets the Marine Corps requirements. The issues you spoke of and the reasons for the Army delaying a full-rate production were not Marine Corps issues; they were unique to the Army.

As a joint program, though, obviously, as they work their way through solutions to them, we will be right next to the Army to see the changes that they make in the glass of the vehicle. In the other two items, we will see how that pans out in relation to cost.

But we have already contracted for, purchased the low-rate production, about 1,600 of them, this year. And then we will wait for the full-rate production and go from there.

Mr. CARBAJAL. Would this have an impact on the economy-of-scale reduced price that I assume you were projecting if the Army is going to buy a lot less units of this vehicle?

General BERGER. If they reduce their overall buy, then certainly I think it would be like any other major system; there would be an impact on cost.

So far, we have not seen that. That doesn't mean it won't happen. But this initial decision was just to postpone the full-rate production.

Mr. CARBAJAL. Thank you, General.

Mr. Chair, I yield back.

Mr. NORCROSS. Mr. Bacon.

Mr. BACON. Thank you, Mr. Chairman.

I appreciate you all being here today. And congratulations to the future Commandant.

My first question is on electronic warfare [EW]. What is the current status of the Next Generation Jammer? And how does the fiscal year 2020 budget support this effort and electronic warfare and countermeasures initiatives in general?

Thank you.

Admiral CONN. For the Next Generation Jammer, the first aspect or capability we look for is what we call mid-band. That is fully funded. We had some challenges with respect to structure design that set us back a little bit, but we continued with the internals and the actual EW capability, and we are back on path to deliver that pod.

The next aspect we are looking at is what is called low-band Next Generation Jammer. When you look at where potential threats are going, that is going to be a very important piece of equipment that we need to deny, delay, deceive—I would probably keep it as simple as that—in that high-end threat environment.

And then there are also other aspects of EW on each particular airplane that is under my portfolio. But I am not sure that was exactly your question. But the Next Generation Jammer—when I say E–18G, I should say E–18G with Next Generation Jammer. It is a system of systems between the two.

Did I answer your question, sir?

Mr. BACON. Yes, sir.

Concerning rotary lift, my understanding is there are some pretty extensive infrared countermeasures. We don't have much in the radar countermeasures. Do we need to be doing more there? Or what is your feedback in that area?

General RUDDER. I guess there is always a threat that we need to keep pace with. And when it comes to aircraft survivability equipment, that is no different, whether it is a radar or weapons system. That is what we endeavor to do with all our assets.

With the large aircraft infrared countermeasure right now that we are putting on our V–22 and on our 53 Echo, our KC–130s, and certainly some of our UC–35s and UC–12s, that will—for up to fourth-generation threat for those, that does a pretty good job.

For the radar warning indications, we are always trying to keep up with the next generation of radar systems. And we are doing it with our F–18s as well, because every time we turn around a new system has a new band that we need to deal with. But for our helicopters, certainly the new aircraft survivability equipment, the APRs [radar warning receivers] and certainly the ALQs [airborne countermeasures], are being designed to counter the new threat as it progresses.

Mr. BACON. I am not sure who to ask this question to, but do you sense the OSD [Office of the Secretary of Defense] and the Joint Staff are providing adequate EW direction so we get a unified effort? Or is this sort of service-centric, from your perspective?

Mr. NEGA. Sir, I will take a stab at that.

I have a monthly meeting with Dr. Bill Conley, who is the EW expert in OSD, and I believe that we are in lockstep not just from a policy perspective but an implementation perspective.

And let me add one more thing on the Next Gen Jammer low-band. It is currently in a demonstration phase, and things are going well. The expectation is that system will leverage the section 804 acquisition agility, I will call it, to field that system as quickly as possible.

Mr. BACON. Okay.

General Rudder, I understand you are procuring or requesting two MQ–9s for the Marines. Could you explain a little bit what is the intention there, and do you get much capacity with just two MQ–9s? I mean, I was part of the Air Force and realize the huge network you have to have to provide a full-time cap. So I am just curious, what is your intention there with those two RPAs [remotely piloted aircraft]?

General RUDDER. Yeah. Thank you, Congressman. The current MQ–9s right now are in a contractor-owned, contractor-operated endeavor that we are doing, and, quite honestly, we are in lockstep with the Air Force in how we manage that, because they are helping us with the network and how all this comes into being, especially for the area that it is operating out of.

So one is, first and foremost, as we look at the future of Afghanistan and what Task Force Southwest is doing, is this is fulfilling an UUNS [urgent universal need statement] for them. The purchase that we have in this year's budget allows us to buy these systems that were already operating in a certain location, which is in a really good location, support Task force Southwest, and do other things like networking and weapons that we can't do under the current contracting association. So, first and foremost, to support the warfighter forward.

Mr. BACON. Thank you for your perspective.

Mr. Chairman, I yield back.

Mr. NORCROSS. Thank you.

Mr. Golden.

Mr. GOLDEN. Thank you, Mr. Chair.

General Berger, congratulations again on the nomination.

I think I was telling you the other day, I was having a conversation with a gentleman who was explaining to me his opinion that the high ground didn't matter on the battlefield anymore; we are in an age with UAVs [unmanned aerial vehicles] and other new technologies from the sky, which the grunt in me had a hard time contemplating.

And I think you and I agree that is probably not 100 percent the case, but I thought it raised a good question and wanted to give you the opportunity to maybe talk a little bit about the work that you have in this budget and that the Marine Corps is working on in regards to air defense systems to protect our ground units, where you can give them a little bit of an ability to reach out and fight back against something like a UAV, whether that just be eyes in the sky or even something that might be able to reach out, you know, and bite you.

But certainly something I never had to experience, so I am interested in knowing, what are the Marines working on to make sure that our grunt units are able to compete with UAVs from above or fighting with a peer competitor with fixed- or rotary-wing, you know, capabilities?

General BERGER. Thank you, Congressman. I will start off and ask my teammate to cover ground that I perhaps miss.

A couple things. First, the radar system called G/ATOR [Ground/Air Task Oriented Radar] that we use, are fielding—or started fielding last year and will continue fielding—is a huge advance for us in identifying and tracking targets as they come in, because it is expeditionary and it is electronic, it is phased array. So the G/ATOR is part of the answer to your question. It is not just the shooting part; it is the first end.

MADIS [Marine Air Defense Integrated System], acronym for the system that we have fielded in very limited quantities here in CONUS [contiguous United States] and probably will do overseas as well, is an integrated modular package on a Humvee or a JLTV vehicle that has everything onboard one or two vehicles, including the power system. And that one, initially, kinetic, could be a directed energy solution for a weapons system for it as well. And so far, it is going pretty good in testing. We will see where that goes.

And then the longer range would be a medium-range interceptor. Although not a core mission for us, we need to be prepared for that. And that development is ongoing as well.

And I will ask General Rudder to see if he can fill in holes for me.

General RUDDER. I think your initial comment about the high ground is—as we put together the Marine Air-Ground Task Force [MAGTF] and the aviation and the ground elements that go into that, it is all dedicated on putting human beings, infantry on the ground to seize objectives, forward objectives, as are stated in our advanced basing objectives and operations.

So when we talk about this, we talk about the high-end fight. We get enamored by a lot of long-range systems, and we have to have those too, like the F–35. As we back down into that, right now, swarming quadcopters from enemy cause us great concern. So we need to be able to do that.

So in concert with what General Berger just talked about, whether it is another UAS [unmanned aircraft system] that will take down that UAS or whether it is directed energy, which has a lot of promise for this particular endeavor, having this full spectrum of capability to protect as well as stay on the offensive is all these things we are trying to piece together for the MAGTF.

Thank you, Congressman.

Mr. GOLDEN. Thank you very much. And do you envision anything that might be man-portable for ground units?

General BERGER. Are you talking beyond the Stinger sort of shoulder-launched?

Mr. GOLDEN. Anything coming down the road in terms of ability to engage with UAVs or anything like that.

General BERGER. I will ask General Rudder. Not that I know of, myself. I will ask him if he knows of anything.

General RUDDER. We have a lot of systems that will only offer that miniaturization. And technology right now is providing a lot of capabilities for not only precision-guided munitions that can be launched and hover and loiter at great distances, but, again, smaller UASes that can counter other UASes that we can certainly launch from a man-portable system.

General BERGER. If I could just add one more. We have done some experimentation with man-portable systems for low, slow, kind of smaller UAVs, and they have not panned out so far.

Mr. GOLDEN. I appreciate that. I am interested in that.

And the last thing I would say is, you know, I continue to be interested in your new amphibious combat vehicle and look forward to hopefully having the opportunity to get out there in the field and see one of those in action. And, you know, I think it is an important new, you know, investment that you are making and critical to getting ready for, you know, this whole National Defense Strategy in regards to China and the Pacific.

Thank you.

Mr. NORCROSS. Mr. Banks.

Mr. BANKS. Thank you, Mr. Chairman.

General Rudder, we have heard a lot about the sustainment cost for F–35s. And there seems to be a lot of misunderstanding or misinformation about what the actual costs are versus the CAPE [Office of Cost Assessment and Program Evaluation] estimates. I understand the prime contractor has committed to a $25,000 cost per flight hour by 2025 for the F–35A variant.

I also understand the Marine Corps has done its own analysis of what the actual operations and sustainment costs are currently for the F–35B. Can you share those numbers with us?

General RUDDER. We have worked with the JPO [Joint Program Office], with CAPE, with Navy, with all the different cost estimators that determine what the O&S [operation and sustainment] costs are going to be, and certainly costs per flight hour, and I think we have settled on how we quantify the costing. There are different categories, 1 through 5—manpower, fuel, sustainment, and the like. And we have settled on this.

And I will say, for 2017—the actual cost for 2017, they were $60,000 per hour, and in 2018, they were $51,300 per hour.

So some of that was due to we just didn't fly the numbers of hours that we had bought into, which creates—believe it or not, the less you fly, the higher your cost per hour is. If we look forward to fiscal year 2019, we are striving to be at $39,000 per hour.

The vectors, if all the things that Admiral Winter has talked about as far as getting maintenance closer to the flight line, getting some stability in sustainment, we believe that, you know, that $25,000 per hour is going to be achievable.

Mr. BANKS. Could you compare that for a moment with other fifth-generation fighter aircraft?

General RUDDER. I cannot compare it to other fifth-generation fighter aircraft, only the fourth generation that we have—other fifth gen, would be I guess, would be F–22, and I don't have the numbers here, but certainly I can take that back to my——

Mr. BANKS. Take that for the record?

General RUDDER. Take that for the record.

[The information referred to can be found in the Appendix on page 105.]

Mr. BANKS. Okay. Moving on, I recently introduced the five oceans Navy strategy, which proposes a force structure above the Navy's current 355-ship plan. The Navy we need blends a large force structure in advanced capabilities. In my view deterrence is

a critical component to our fight with near-peer adversaries in preventing large-scale conflicts.

So Admiral Conn, what is the role of unmanned aircrafts such as UAVs in the future fight with near-peer competitors?

Admiral CONN. Well, first we have Triton that is going to be going forward this year, probably later this summer. And then we are going to continue to build capability and capacity with that system in accordance and comply with the NDAA [National Defense Authorization Act] of 2011 that I need the capability and capacity that I have greater than I have today before I can sundown the EP–3 in 2021, and we are on track to do that.

MQ–25 is going to be the next big system that we put, and we are going fly it off our aircraft carriers. It is primarily a tanker. It has some secondary capabilities of providing ISR [intelligence, surveillance, and reconnaissance] but the primary mission is a tanker. As I look to the future, I think to the past. I think the PBYs [World War II Patrol Bombers], the eyes and ears of the fleet being out there extended range, relaying information back to decision makers. I see that in the future of large UAVs flying off our carrier.

Mr. BANKS. That is helpful feedback. General Berger, in your testimony you spoke about the investments needed in manned/unmanned teaming in autonomous systems to facilitate sea control and denial. What capabilities and technologies do we need additional investment in to be competitive with our adversaries?

General BERGER. Just to make sure I understand—beyond autonomous, beyond?

Mr. BANKS. Yes, sir.

General BERGER. Okay. First off, thanks for the question. I would say our collective approach is not to match but to gain overmatch because the match is kind of a fair fight that General Dunford says we are never going to go into and none of us do either. The manned to unmanned teaming you spoke of is hard work. We have found over the past year and a half, 2 years, very hard work to do. But actually the teaming of that, younger Marines and soldiers take to it pretty easily.

I think the longer term is going to be the depth part either offensively or defensively in depth. In other words, conceivably unmanned systems way far forward. Another unmanned system that can act as sort of a mothership on shore or on land, and then the manned portion and unmanned—unmanned portion further back. In other words, a layering all the way out in great depth.

I think the Navy is also making huge strides in subsurface, which we absolutely need to have in sea control and sea denial sort of roles. And lastly I will just say that the challenge for us is in the command and control, the fusion of all of that sensing when fighting as an—operating as a naval expeditionary force, how to pull all that together, how to fuse it, and how to distribute it in a manner that the appropriate commanders can act on it.

Mr. BANKS. Thank you. My time has expired.

Mr. NORCROSS. Mr. Courtney.

Mr. COURTNEY. Thank you, Mr. Chairman. Thank you to all the witnesses for being here this morning. General Rudder, the funding for continued development of the K–MAX unmanned helicopter was not included in the initial budget proposal but was included in the

unfunded priorities list. It is about $18 million. Again, the K–MAX program in Afghanistan in 2011 flew thousands of hours, and I think they racked up a pretty good record of 4½ million pounds of cargo for Marines and Task Force Southwest, which basically was the equivalent of about 900 convoys through pretty dangerous territory. So if Congress does agree to that unfunded request, can you discuss how the Marines would use that funding to continue research on heavy-lift unmanned helicopter cargo lift?

General RUDDER. Thank you, Congressman. We bought those K–MAXs in a government-owned contractor-operated agreement in Afghanistan. When we came back we endeavored to make them a program of record, and are still working down that road, but we were not able to secure the funding to get that back flying in the fleet for test and operational usage for experimentation.

We have since, now, with the thanks really of this committee to secure funding for that so now we have a cooperative research and development contract that we are working with K–MAX and they will take in—whether it is happening right now or in the next few weeks they are going to be trucked back to Connecticut and we are going to give them to the vendor to let them work through a couple different things. One is autonomous logistics delivery. Like we learned in Afghanistan, there is certain things that you want on call, but there is other things that you just need to have going autonomously.

And I think the K–MAX with its lift capability and the way we conceive distributed operations in the future, if we get those airplanes we are going to configure them as we are configuring this test vehicle back in Connecticut with autonomy which will allow them to have terrain-following type of radar, and it will be able to push a button, it will take the cargo to a particular point that you have programmed in, it will drop that cargo, and do it all day long. And we have seen efficiencies with this over time.

So with the money that we have, we do have funded right now to do those two aircraft that we own back in Connecticut. We will bring those back hopefully by the end of next summer to begin experimenting in Yuma and Twentynine Palms. But the extra money that is in there now is to create a few more air vehicles so we can kind of expand this usage. Because we see this as the future of distributed operations, how we logistically supply ourselves.

Mr. COURTNEY. Fairly modest request in Washington math, so again, I appreciate that answer and hopefully that will help us as we get closer to the mark. According to the Navy's long-term tactical aviation inventory plans, the Navy continues to maintain a mix of fourth-generation FA–18s and fifth-generation F–35s through the 2030s.

Admiral Conn, can you talk about how you plan to integrate the F–35s with the legacy aircraft and carrier air wing during that transition period, and in particular whether there is particular missions that you would select or prioritize for one type of aircraft over the other?

Admiral CONN. We have been doing this integration effort for a long time. Working with the Air Force, working with the Marines, working out in Fallon, Nevada, with some of our young disciplined trained aviators that fly out of TOPGUN [U.S. Navy Strike Fighter

Tactics Instructor Program] or fly out of Strike [Navy Strike Warfare Center], those type of people are the people that need to do this work and they are doing it in terms of how we are going to integrate this fifth-generation capability into the air wing.

And in terms of some of the missions, I see, as Admiral Winter has suggested, you know, the F–35 operating forward acting as a quarterback. Sensing, collecting, reeling, and in some cases killing, various targets that are out there. But I also have trucks known as a Super Hornet that can carry a lot of ordinates that the F–35 is out there sensing, relaying the information to a long-range weapon and getting it on the target. Also working with the E–2D; between the E–2D, the F–35C, the F–18 Super Hornets, the E–18G Growlers, when you put a fifth-generation asset in there we just get better across all mission areas.

If I had to go over the beach in some areas it makes more sense to put an F–35 over the beach than a Super Hornet. It doesn't mean I can't put a Super Hornet over the beach, but the risk is a little bit different.

Mr. COURTNEY. All right. Thank you. I may follow up with a written question after the hearing about just integrating also how you are going to maintain two different types of aircrafts, you know, in the close space of an aircraft carrier, but, again, I thank you for your answer this morning, and I yield back.

Admiral CONN. Yes, sir.

Mr. NORCROSS. Mr. Wittman.

Mr. WITTMAN. Thank you, Mr. Chairman. Gentlemen, thank you so much for joining us today and for your testimony. I wanted to begin with Lieutenant General Rudder and talk specifically about the CH–53K King Stallion heavy-lift helicopter. Last year we heard about how great this bird was going to be, the strongest, the smartest, the best heavy-lift helicopter that money can buy, and now we are hearing reports that the initial operational capability milestones that are set for this December are not going to be met, that that is going to have to be pushed back, that there are a whole list of elements there that have to be looked at so the initial operation test and evaluation may not occur until 2021. There is a whole list of design deficiencies, and I want to point some of those out.

The issues reported are airspeed indication anomalies; tail boom and tail rotor structural problems; low reliability for main rotor gear box; fuel system anomalies; overheating of main rotor dampers; and hot gas impingement on aircraft structures. A list of ones that are, you know, if you are a pilot such as the great pilots you have in the Marine Corps and with your experience those things are concerning about where we are with that.

So my questions really are threefold. What is being done to correct those issues? What is in the pipeline? Is this year's budget request enough to make sure that we correct these design deficiencies, and as we are looking at the ability to deploy this helicopter are we on track to deploy it in 2023 or is it going to be 2024, because I think making sure we have that helicopter available to replace the Echoes [CH–53Es] is a key element. So I wanted to get your perspective.

General RUDDER. Thank you, Congressman, and you are exactly right. It is important. Heavy lift is still a—really a DOD require-

ment and a Marine Corps requirement still especially for distributed operations. This airplane, last year we moved it from testing in West Palm Beach, and we moved it to Pax River where we put it through its paces. We brought it out to Colorado, did high altitude testing, we banged it around in the dirt out there, and we found some things.

And we found some things because good Marine test pilots and Navy—and the naval enterprise found things that needed to be fixed. So the delays that you see right now is to make sure we get it right. And I think I may even defer to Mr. Nega and talk about how we are negotiating the next few contracts is that we are going to build concurrency into our next contracts, so when the Marines get a helicopter it's going to have those things.

All the things you just talked about are going to be fixed before we give it to the fleet. If I back out from that, this aircraft did some unbelievable things this past year. It lifted 36,000 pounds, it still can go, you know, 100 miles, 27,000 pounds, three times what the 53 Echo can do.

Now the question is to fix these technical deficiencies we have, and they are all fixable, and at this part of the program and give the Marines, the maintainers especially and our great pilots, the aircraft they deserve.,

But I think we are on the right track. You will see where we put in this year's budget we put what we need to fix as well as, you know, manage our procurement a bit to make sure that we do not get ahead of ourselves.

But if you let us continue on with the money we have asked for this year and the money that we asked for for next year we are going to fix this and we are going to deploy it in 2024.

Mr. WITTMAN. Thank you. Lieutenant General Berger, first of all, congratulations on your nomination. We are excited about that. And I know that you will do a fantastic job. And we appreciate the great work that you have done throughout your Marine Corps career.

I wanted to talk about munitions. And as you know having munitions in the right places and the right types of munitions are a key logistical element there on the battlefield, and as I have had the opportunity to travel and talk to Marines forward deployed in those areas many of the issues come up about having the right quantities of munitions in the right places and the right types of munitions. Can you give me an overview about where we are with the Marine Corps with having the right complement of munitions, having them in the right places, in the right quantities?

General BERGER. I will, Congressman. Thanks for the question. And just to make sure, is your focus on small arms?

Mr. WITTMAN. Yes.

General BERGER. Because—very good. Over the past perhaps longer than 2 years, probably closer to three or four, a whole lot of work done on the munitions, the 556 round that we have, to make it more lethal, and we have gone through several iterations of that with the Army.

Parallel to that was a different type of cartridge that lessened the weight to make it carrying the same amount of rounds would be cutting the weight by maybe two-thirds. The first one on the

lethality I think the work so far between the Army and the Marine Corps is very solid, and the evolution of rounds that we used in Afghanistan kind of reflected that. There is another look, again, at the caliber to see if 556 is what we want as a service and as a Department of Defense, and I think all the right people are working on the answer to that question.

Above that all good things like rockets where we fielded MAAWS [Multi-purpose Anti-armor Anti-personnel Weapon System] in place of the small, the medium machine gun 50 cal kind of 762 and up to 50 cal again looking at a different type of cartridge that will lessen the weight and make it more expeditionary.

I think—I don't know where the decision point is, so I will ask on the caliber issue, but I do know it is one that both the Marine Corps and the Army are side by side on, and I don't know any as far as the timeline, sir.

Mr. SMITH. We will take the caliber and the timing for the record, the question for the record. We will get back to you.

[The information referred to can be found in the Appendix on page 105.]

Mr. WITTMAN. Very good. Thank you.

Thank you, Mr. Chairman. I yield back.

Mr. NORCROSS. We are to go through a second round of conversations, obviously fewer of us, and we are expecting votes quite frankly at any moment.

General Berger, I want to give you an opportunity to give a more visionary or strategic view. For the Marine Corps posture review identifies the Commandant's highest priority command and control [C2] in a degraded environment. How will the Marine Corps fiscal year 2020 request put you on a path to delivering this resilient, affordable C2 network?

General BERGER. Sir, thank you. The way that you described it is exactly why it is number one for General Neller for the Marine Corps. We have a lot of sensing systems that we are fielding now and the next couple years. Our challenge as a naval force is how to integrate that and do it in a contested electromagnetic spectrum sort of environment, and that is not easy work. Because the mixture in just aircraft of fourth- and fifth-gen aircraft and pushing the processing and dissemination of that information, really difficult.

Hard enough to do if it wasn't in a contested environment, but we absolutely expect the threat to go after our C2 systems first, before logistics, before everything else, because they believe that is our Achilles heel.

So for us, Navy and Marine Corps, it is number one for the Marine Corps because if we can't have the network that we need, and we absolutely will—then you break the force down in individual small elements. It is going to remain number one the rest of this year, and a fair portion of the requests this year is aligned towards that, sir.

Mr. NORCROSS. But as you move forward obviously you are preparing for this in our new equipment. How are you dealing with it with the legacy equipment that we have?

General BERGER. Retrofitting is probably an idea that only the last few years we have started writing it into requirements in the

way we probably should have all along, but it wasn't so necessary; now, it absolutely is. For example, we have Fox—we have 117 Golf and Fox radios. Retrofitting them, difficult work. Retrofitting a Humvee, hard work. The M1A1 tank, it is analog, not digital.

In some of the legacy systems there is a point we reach like with the M1A1 [Abrams tank] where you cannot go any farther or the LAV [light armored vehicle]. The ACV [Amphibious Combat Vehicle], the combat vehicle that we are starting to field, baked into it, built into it. But for the legacy systems you mentioned, sir, some will be bolt-on, kind of aftermarket work, and some will be in a separate system that does the fusion between legacy analog into a digital fifth gen.

Mr. NORCROSS. Have you done scrub down of all those systems to see, you know, this comes down to what you do is making these tough decisions, what risk are you able to take on, how much of an investment into our older equipment versus accelerating some of our new ideas.

General BERGER. We have, sir, and in the budget that was submitted you will see cancellation of some legacy programs that were going to upgrade C2 systems, in favor of a more modern platform.

Mr. NORCROSS. Thank you.

Mrs. Hartzler.

Mrs. HARTZLER. Thank you, Mr. Chairman.

And General Berger, I wanted to add my congratulations along with my colleagues on your new role. I look forward to working with you, and have a question for you and Mr. Smith.

As you know, the Army is rapidly developing the next-generation capabilities with respect to long range precision fires, combat vehicles, future vertical lift programs in the fiscal year 2020 budget. I was wondering if—what are you doing to develop and invest in these next-generation capabilities and how are you coordinating with the Army in these initiatives.

Mr. SMITH. Well, ma'am, let me assure you that we are closely tied to the Army. They are much larger for us, and they are already working on things. They have a larger budget, and the Marine Corps benefits greatly from leveraging and working together as a combined force. There is no daylight between us when it comes to the capability that we are working to extend forward modernization efforts and bringing forth new technology.

We have joint programs and a joint light tactical vehicle where we are working great together with one another so that synergy continues.

Mrs. HARTZLER. That is great. As far as the Block 4 modernization with the F–35, you have committed to a significant amount of funding to support this initial Block 4 modernization, but as I said in my opening statement, I think there is some concerns with the projections going forward with the idea that every 6 months there is going to be this big leap as the cost.

So how can you assure us and the taxpayer that Block 4 modernization program won't follow in the footsteps of the F–35's baseline program, which saw significant cost and schedule growth during its development?

Admiral WINTER. Thank you, ma'am, and it is a great question. So we start with the maturity of hardware and software of the

Block 3F and the Block 4 takes the warfighting capabilities that were identified by our services to address the pacing threats through 2025, and we looked at the Block 3 app to see where the modernization enhancements and improvements needed to be made to stay in front of that threat. It is not a clean sheet of paper. The airworthiness and the outer mold line, the majority of that structure—all the structural work that was truly some of the unknowns over the Block 3 and the earlier development has all now at a maturity level.

What we see for Block 4 capability is about 80 percent software modernization of current fielded software and 20 percent enabling hardware that will not change the outer mold line of the aircraft. It will not drive additional airworthiness testing in the same way and the manner and the capacity that we had in Block 3.

Mrs. HARTZLER. That makes sense. That makes sense. I have heard the bell, so are we voting right now?

Okay. Just a couple quick other things. As you know, Secretary Mattis had the 80 percent mission-capable rate as the goal, and I was wondering if you could just kind of give us an update on where we are at on the readiness rate of our aircraft.

Admiral CONN. For Super Hornets, ma'am, I will keep this brief because I know there is a tight timeline. We have invited industry, asked industry to come out and assess our processes at our squadrons, at our depots in California, and our intermediate activities. We have reduced planned maintenance intervals [PMIs] on Super Hornets from 120 to 60 days, and not only did we cut it in half, the quality of the product that is coming out of that PMI event is that much better, and the aircraft is flying within a week from that PMI event, in some cases 4 days. We are trying to reduce our 84-day inspections down to 3 days. We have looked at treating artisans that do these PMI events and repair repairables as surgeons.

Surgeons don't leave the patient and don't leave the operating room in the middle of a procedure. You plan the event, you know the resources you require, and you keep the artisan focused on that effort. So those are just a few of the things.

What are the results? The MC [mission-capable] rates we see as a volatile stock market right now. The highs are getting higher, the lows aren't going as low, but the vectors are going in the right direction. We have seen anywhere from 63 percent MC rates, that is a snapshot in time on a given day, to 76 percent MC rates, a snapshot in time on a given day, and they fluctuate in between. We need to understand what is causing that variance, fix what we can to maximize the peaks, minimize the valleys, and keep the vector going in the right direction.

Mrs. HARTZLER. Great. Admiral Winter, do you want to give the F–35 rate?

Admiral WINTER. Yes, ma'am. Similar to Admiral Conn, we have identified the root causes and the levers needed to ensure the availability and the mission-capable rates for the F–35. We look across our entire fleet and have taken a full system look. We need to make sure that we have increased spare parts on the flight line. We need to make sure we can repair parts or accelerate in the depot standups in the United States, and we have pushed flight line maintenance authorities to our warfighters on the flight line

where they had to send back parts or send back to get the maintenance completed. They can now do that—those actions on the flight line.

Those three have and will continue to increase the availability and the mission-capable rates of our F–35. What we look at right now is a snapshot of our combat coded fleet. We have the F–35A is 61 percent, F–35B is 64 percent, and the F–35C is 84 percent. When we deploy and we provide afloat spares packages and deploy packages, those mission-capability rates average between 65 and 85 percent as we move forward.

Mrs. HARTZLER. That is great. I am concerned that you said that Lockheed Martin they have a 200-part shortage every month, so I am glad that you are getting after the parts and focused on this.

I think we will go ahead and stop, but thank you very much.

Mr. NORCROSS. Just a quick interjection because I might have picked up on it incorrectly. General Rudder, you were talking about the sustainment costs, and you alluded to that when we came to a set of criteria that you were including in that. I am paraphrasing. Are the criteria that you take into account to come up with sustainment costs different than other service branches or is there continuity across the board?

General RUDDER. Every service computes their costs a bit differently, but with the F–35 we have come together with CAPE, the JPO, and the Navy, and we are on the same sheet of music as far as computing costs. But in the very beginning we were including some things, not including other things, but we have now in the past year—of course it has been about year now since we have come together, and we are all on the same sheet of music when it comes to those criterias that we are including for the cost.

Mr. NORCROSS. We are comparing apples to apples. Mr. Golden, do you have any questions?

Mr. Wittman.

Mr. WITTMAN. Thank you, Mr. Chairman. I just have a quick question for Rear Admiral Conn. As we look at where we are today in great power competition the debate back and forth has been how do we maintain and in some areas create a larger delta between our adversaries and ourself because we want them to remain near-peers. But as we look at where we are coming with the deliberations back and forth about the remaining 2 years of the Budget Control Act of 2011, the potential of sequester is there. And you had talked about modernization and how critical modernization is not only with current aviation platforms in making sure that we get the new F–35 on board and, Admiral Winter, I know you have talked about that too.

So I wanted to get your perspective about where did the Navy see themselves if sequester were indeed to come back as far as modernization, and where does that leave the United States in relation to maintaining and in some instances trying to enhance still keeping our adversaries as near-peers.

Admiral CONN. If we go back to sequestration levels it will drive us back to making false choices between readiness and modernization, which is in some cases why we are sitting where we are today. There is a lot of programs we have both today to keep them ready

or to modernize them, let alone all the things we have to do in the future. Every aircraft in CNATRA must be replaced by 2035.

The E–6B has a pretty important mission. I have to recapitalize that. C–130, I mean the list is long. And SLM, service-life modernization, for taking a Block 2 into making it a Block 3 Super Hornet. You know, we are finally at place where we are buying more aircraft, either F–18 Block 3s, F–35Cs, and when you add up the SLM efforts and number of aircraft we are going pump out we are delivering more aircraft than we are burning up each year, which allows us to now get out of some old legacy systems, get rid of the F–18Ds, A through D's, give the rest to the Marine Corps, drive down costs across the force. That would cause some significant challenges, and we always have hard choices to make. The choices would get that much harder.

In terms of being able to provide the force that is going to fight and win in that high-end environment, that would be at risk.

Mr. WITTMAN. Very good. Vice Admiral Winter, any thoughts on that?

Admiral WINTER. I see the F–35 stays at full sprint in development with our modernization, full sprint and production to 2044, and full sprint as we go from 395 air systems to 1,200 air systems just over the next 4 years. Any reduction or substantial reduction to funding amounts in development, production, or sustainment will have considerable impact and will erase all of the initiatives and all of the gains in affordability that we have worked so hard to gain and we are on the precipice here.

My biggest concern across the F–35 is truly my supply chain management, and any disruption to the supply chain, be it self-imposed or otherwise, will have a direct impact in the ability to produce airplanes and sustain them, and then my warfighter is not going to need to modernize them because he is not going to buy them.

Mr. WITTMAN. Got you. Very good. Lieutenant General Rudder.

General RUDDER. When you all really put in and helped us in the budget lane to begin investing our readiness accounts fully and while certainly modernizing. And for the Marine Corps we are transitioning our complete fleet. So just an example for the FRCs [Fleet Readiness Centers], our depots, in the past few years the depots have hired back 2,700 artisans and engineers and workforce, and we are catching up with our depot. Aircraft are coming out, and they are flyable, and they are a great product.

Our spares accounts now we have now fully funded our spares accounts. This year for the F–18 alone we will reap the benefits of $1.6 billion of spares that we were able to put in for those accounts while all at the same time supporting the NDS [National Defense Strategy] and buying new airplanes, F–35s, CH–53K, we are going to finish off our V–22 buy and our KC–130 buy here in the next few years.

So to do that we go back to the competition and balance. And we have committed at this table to fully fund our readiness accounts, and if we stay committed to that in a sequestration-like event that means that something is going to give in our modernization accounts.

Today the budget that we have set forward allows us to balance. Readiness as well as modernize, and to compete in this world I think we are going to need to maintain that for quite some years to catch up.

Thank you, Congressman.

Mr. WITTMAN. Lieutenant General Berger, your perspective? I know you have a very—much broader perspective outside of the aviation realm, but also across all Marine Corps operations.

General BERGER. I would agree with what was already said, Congressman. We would triage just like you would any patient. You would absolutely make sure that the next units that are deploying and the ones that are already deployed have everything that they need. You are not going take anything away from that. You are going to hurt research and development. You are going cut that. We would cut the modernization way down because what we can't have is a carrier strike group or an ARG MEU [amphibious ready group Marine expeditionary unit] go out anything less than 100 percent ready.

So we would triage the patient, cut off modernization, reduce research and development, do whatever we needed to do to make sure the units that were on the slate to deploy are ready.

Mr. WITTMAN. Thank you, Mr. Chairman.

Mr. NORCROSS. Thank you. And if it was up to the Armed Services Committee we wouldn't have the problem. It is a matter of those who aren't in this room who need to hear it.

I just want to follow up with one item and line of questioning from Mr. Wittman on the CH–35K. General Rudder, for the record can you talk about any new contract that you might enter into, how it will address the deficiencies and any potential ones?

[The information referred to can be found in the Appendix on page 105.]

General RUDDER. We are endeavoring right now to enter into a contract that addresses all the deficiencies, as well as any new deficiencies as part of the delivery of that aircraft.

Mr. NORCROSS. Now that contract might include a set-aside for any future unseen issues?

General RUDDER. It could.

Mr. NEGA. Yes, sir, let me jump in. There is an expectation, and we are in negotiations right now with Lockheed, there is an expectation that on that LRIP [low rate initial production] contract that there is a risk sharing that goes on there. So for any new discovery that risk will be shared by the contractor.

Mr. NORCROSS. So it sounds like that Lockheed, who is at risk here if they enter into that, understands that by now they should have found any major issue?

Mr. NEGA. The flight envelope has been tested to the corners. General Rudder talked about how we sort of—we have wrung it out. There is a relatively low risk that anything major will be found; however, if nuisance issues come along, we are not going to give those nuisance issues to the Marines, and the Navy and Marine Corps team is not going to accept the full risk of that, so the risk concurrency between the development and the production there is that overlap is going to be taken care of.

Mr. NORCROSS. But that is cost risk, we still have the time risk?

Mr. NEGA. Correct.

Mr. NORCROSS. Thank you. Mrs. Hartzler, any other questions?

Mrs. HARTZLER. No.

Mr. NORCROSS. Any closing statements?

We want to thank all the witnesses for working with us today, and perfect timing, votes are being called.

We are adjourned. Thank you.

[Whereupon, at 10:35 a.m., the subcommittee was adjourned.]

A P P E N D I X

April 4, 2019

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

APRIL 4, 2019

Tactical Air and Land Forces Subcommittee Chairman Donald Norcoss – Opening Statement (As Prepared)

Hearing on "Navy and Marine Corps Tactical Aviation and Ground Modernization"

April 4, 2019

The Tactical Air and Land Forces subcommittee meets today for our first hearing of the 116th Congress. We're going to review the tactical aviation and ground modernization programs for the Navy and Marine Corps that were included in the fiscal year 2020 budget request.

The subcommittee has been busy over the past few weeks; we've been attending briefings with representatives from all military departments so that we can learn about and discuss mission areas and programs related to the jurisdiction of the subcommittee. The briefings have been very informative and establish the foundation of our oversight activities for this Congress.

I would like to welcome our distinguished panel of witnesses that includes Vice Admiral Mat Winter, Program Executive Officer for the F-35 Joint Program Office; Rear Admiral Scott Conn, Director of Air Warfare for the Chief of Naval Operations; Lieutenant General Steve Rudder, Deputy Commandant of Aviation for the Marine Corps; Lieutenant General David Berger, Commanding General of the Marine Corps' Combat Development Command, and the Deputy Commandant for Combat Development and Integration; Mr. Daniel Nega, Deputy Assistant Secretary of the Navy for Research, Development and Acquisition for Aviation programs; and, Mr. Jimmy Smith, Deputy Assistant Secretary of the Navy for Research, Development and Acquisition for Expeditionary Programs and Logistics Management.

General Berger, before we begin our formal remarks, I'd like to congratulate you on your nomination to be the next Commandant of the Marine Corps. Although I have only served as Chairman of this Subcommittee for a short time, I have enjoyed working with you and know that our nation and Marine Corps will be well-served when you are confirmed as the next Commandant. I also want to thank the other witnesses for your service and look forward to your testimony today.

This hearing continues the subcommittee's oversight of tactical aviation acquisition and modernization. We are grateful to pick up the work started by the notable leadership of our former subcommittee chairman, Mr. Mike Turner, and the recently retired Ranking Member of the subcommittee, Ms. Nikki Tsongas. They were a great team, and I look forward to partnering with my Ranking Member, Vicki Hartzler, in continuing the subcommittee's bipartisan efforts.

Over the last several years, the subcommittee has learned how years of continuous combat operations and deferred modernization has created a crisis in military readiness and combat capability. It is good to see, however, that the fiscal year 20 budget request indicates that we may be starting to see real improvements.

Investment in equipment modernization and recapitalization are becoming top priorities for the Navy and Marine Corps, and a plan to achieve a modern force – one that is ready for the challenges posed by more capable, near-peer adversaries is taking shape. But surely this will come at a cost.

The subcommittee will be interested to learn from our witnesses what trade-offs they recommended over past budgets to align themselves with the new Defense Strategy – a strategy that ensures we maintain – or in some areas regain – technological and military advantage. Also, given the size of the Overseas Contingency Operations request, we need to understand what programs and capabilities within our subcommittee are funded as 'base items' in the OCO request.

Our witnesses today have been asked to provide an overview of the Navy and Marine Corps modernization and equipping strategy for FY 20 and to identify any significant changes to this strategy from FY19. Today we want to pay particular attention to maneuver, tactical and rotary- wing aviation, fires, and air defense forces modernization. We also hope to learn about any new modernization initiatives in the budget request and how those programs align with and directly support the goals and objectives of the National Defense Strategy. Plus, we hope to learn how any programmatic trade-offs will affect those goals, as well as the Navy and Marine Corps' famous readiness tag-line to "fight-tonight."

We have large portfolio of complex and expensive programs to review today, including the Navy and Marine Corps F-35 B and C variants, the CH-53K King Stallion helicopter program, Marine ground vehicles including the Joint Light Tactical Vehicle, the Amphibious Combat Vehicle, unmanned vehicles, and ground-based air defense systems. However, the over-arching goal today is to better understand the strategy applied to funding and fielding all of these programs.

Regarding tactical aviation, we want to learn more about the strike-fighter force structure mix of fourth and fifth generation aircraft, the ratio you are striving to achieve within the portfolio, and how operational risk of that ratio is managed in supporting Combatant Commanders.

We want to receive an update on the F-35 program to understand the challenges the services are having with achieving affordable operations and sustainment costs, learn about improvements being made to the problematic and very complex Autonomic Logistics Information System, or 'ALICE,' receive a progress update on Block 4 development and projected cost, and find out how the F-35 program office is working to establish greater capacity and effectiveness with supply chain management to support both new production and fielded units. The F-35 is a much- needed capability, but we don't have an unlimited amount of resources that can be applied to the program. We need all stakeholders directly involved in the F-35 program to start achieving tangible, near-term results related to all the aspirational goals, targets, and objectives we continuously hear will manifest in later years.

We also want to learn more about how the Navy and Marine Corps are funding initiatives to address the past problems related to Physiological Episodes.

This issue was a high-priority in the past for this subcommittee, and it will continue to be under my leadership until it's resolved.

Before we begin with your opening statements, I would like to turn to my colleague from Missouri, Mrs. Vicki Hartzler, for any comments she may want to make.

NOT FOR PUBLICATION UNTIL RELEASED BY THE
HOUSE ARMED SERVICES COMMITTEE
TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

STATEMENT OF

MR. DANIEL L. NEGA
DEPUTY ASSISTANT SECRETARY OF THE NAVY
AIR PROGRAMS

AND

LIEUTENANT GENERAL STEVEN RUDDER
DEPUTY COMMANDANT FOR AVIATION

AND

REAR ADMIRAL SCOTT CONN
DIRECTOR AIR WARFARE

BEFORE THE

TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

OF THE

HOUSE ARMED SERVICES COMMITTEE

ON

DEPARTMENT OF THE NAVY AVIATION PROGRAMS

April 4, 2019

NOT FOR PUBLICATION UNTIL RELEASED BY
THE HOUSE ARMED SERVICES COMMITTEE
TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

INTRODUCTION

Mr. Chairman, Ranking Member Hartzler 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 (FY) 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 FY 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 predictable and on-time budgets commensurate with the challenges we face together as a nation. Receipt of an on-time budget in FY 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 FY 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 FY 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 FY 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 FY 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 FY 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 FY 2030 timeframe to bridge the transition gap to an F-35B/F-35C fleet.

The FY 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 FY 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 FY 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 FY 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 FY 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 to160 aircraft. This fulfills current Navy requirements for AEA for nine CVWs and five expeditionary squadrons plus one reserve squadron. The FY 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 FY 2022.

Our FY 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 FY 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 FYs 2019-2023, the FY 2020 budget also requests $934.7 million in APN for four Full Rate Production (FRP) Lot 8 aircraft and Advance Procurement for FY 2021 FRP Lot 9 aircraft.

ASSAULT SUPPORT AND LOGISTICS SUPPORT AIRCRAFT

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

The FY 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 FY 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 FY 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 FY 2024 timeframe. The FY 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 FY 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 FY 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 FY 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 Positioning 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 FY 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 FY 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 FY 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 FY 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 FY 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 FY 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 FY 2020 President's Budget requests $307.0 million to procure three KC-130Js and spares as part of the FY 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 FY 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 FY 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 Aries

The EP-3E Aries 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 FY 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. FY 2020 investments are aligned to deliver air vehicles and control station capacity to achieve IOC in FY 2021, continue our efforts to deliver five full Triton orbits to meet increasing warfighter ISR demands, and enhance MQ-4C capabilities.

The FY 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 FY 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 FY 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 FY 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 FY 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 FY 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 FY 2020 President's Budget requests $21.2 million for research and development requirements.

Common Control System (CCS)

The FY 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 FY 2018. CCS VM functionality was delivered to MQ-8 Fire Scout in early FY 2019 with another delivery scheduled for the third quarter of FY 2019. In FY 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 FY 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 FY 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 FY 2019.

The FY 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 FY 2028-2030 timeframe.

Sidewinder Air-Intercept Missile (AIM-9X)

The FY 2020 President's Budget requests $19.5 million in RDT&E and $119.5 million in W for AIM-9X. RDT&E will be applied toward the Engineering Manufacturing Development of criti hardware redesign driven by obsolescence; developmental test of System Improvement Program missile software (Version 9.4); and design and development of Insensitive Munitions improvement 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 FY 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 FY 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 FY 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 FY 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 FY 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 FY 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 FY 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 FY 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 FY2019. 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
FY17	1,072,156	25	2.33	35	3.26	239	22.29
FY18	1,072,229	19	1.77	40	3.73	249	23.22

The most recent (FY 2017-13 Mar 2019) DoN flight Class A mishaps include:

- 28 Feb 2019: (MCAS Miramar, CA) Two F/A-18C's collided in mid-air while conducting CAS. Both aircraft landed safely. No injuries.

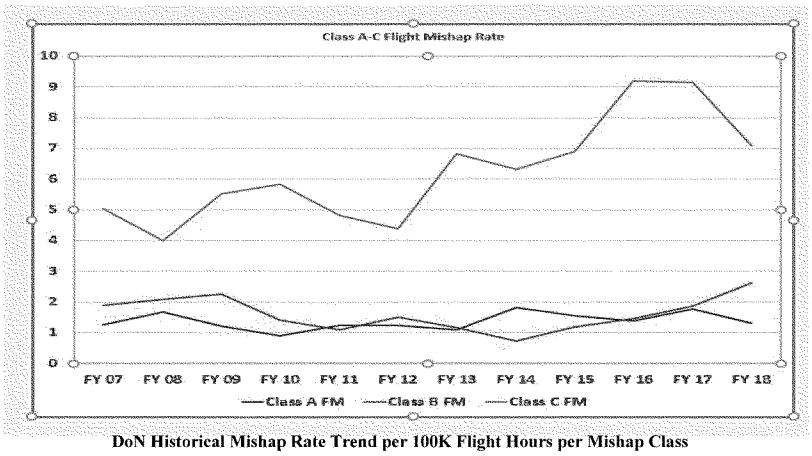
- 05 Dec 2018: (Philippine Sea) F/A-18D and KC-130J collided while performing fixed wing aerial refueling mission. F/A-18 aircrew ejected with one fatality. 5 aircrew fatalities in the KC-130.
- 12 Nov 2018: (Philippine Sea) F/A-18F aircraft malfunction resulting in loss of aircraft; aircrew recovered and in stable condition.
- 18 Oct 2018: (Pacific Ocean) MH-60R crashed on takeoff onboard CVN.
- 04 Oct 2018: (NAS Lemoore, CA) A right engine fire occurred on a F/A-18F during a training flight. Emergency landing with no injuries.
- 28 Sep 2018: (Beaufort MCAS, SC) F-35B crashed. Pilot ejected safely.
- 21 Aug 2018: (VACAPES) F-35C ingested FOD while conducting aerial refueling operations with an F/A-18F. Both aircraft were damaged.
- 16 Aug 2018: (Near Mountain Home AF Base, Idaho) Aircraft suffered hard landing in FARP prior to refueling operations. No Injuries or casualties.
- 02 Aug 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 Apr 2018: (Iwakuni, JP) FA-18E experienced Class A mishap in flight. Aircraft recovered safety.
- 03 Apr 2018: (El Centro, CA) CH-53E impacted ground while on approach into a landing zone. 4 fatalities.
- 02 Apr 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 Mar 2018: (Key West, FL) F/A-18F while flying single engine, crashed on short final. 2 fatalities.
- 11 Dec 2017: (Tinker AFB, OK) E-6B struck birds during descent, leading to number 4 engine flameout.
- 04 Dec 2017: (NAS Fallon) F/A-18A right leading edge flap departed aircraft in flight and hit the vertical stabilizer.
- 22 Nov 2017: (Philippine Sea) C-2A ditched while inbound to CVN with 11 onboard. 3 fatalities.
- 11 Oct 2017: (Futenma MCAS, Japan) CH-53E engine fire in flight, emergency landing. No injuries.
- 01 Oct 2017:(Monroe County, TN) T-45C crashed on low-level training route. 2 fatalities.
- 28 Sep 2017: (Syria) MV-22B crashed on landing during support mission.
- 12 Aug 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 Aug 2017: (25 Miles South of Key West, FL) F-5N went down over water. Pilot ejected safely.
- 05 Aug 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 Aug 2017: (North Island NAS, CA) F/A-18F struck round down with right horizontal stabilator upon landing. Diverted successfully.
- 16 Jul 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 Jul 2017: (Indianola, MS) KC-130T crashed on logistics flight from Cherry Point to El Centro. 16 fatalities.
- 26 Apr 2017: (Off the Coast of Guam) MH-60R collided with water on initial takeoff from ship. No injuries.
- 21 Apr 2017: (Philippine Sea) F/A-18E lost on approach to landing on carrier. Pilot ejected without injury prior to water impact.
- 05 Apr 2017: (Yuma, AZ) CH-53E landed hard and rolled on day training flight. Crew of five uninjured.
- 28 Mar 2017: (El Centro NAF) HH-60H main rotor blades contacted tail rotor driveshaft on landing.
- 17 Jan 2017: (NAS Meridian, MS) T-45 crashed following a BASH incident on takeoff. Both crewmembers ejected. No fatalities.
- 13 Dec 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 Dec 2016: (Off the Coast of Iwakuni MCAS, Japan) F/A-18C crashed into the water while conducting a night mission. One fatality.
- 21 Nov 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 Nov 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 Oct 2016: (MCAS Beaufort, SC) F-35B had an inflight weapons bay fire followed by an uneventful landing. No injuries.
- 25 Oct 2016: (Twenty-nine Palms, CA) F/A-18C crashed on final approach. Pilot ejected successfully. No injuries.
- 20 Oct 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 Feb 2019: (Tinker AFB, OK) E-6B being towed out of a hangar when vertical stabilizer struck the hangar. (AGM)
- 09 Dec 2018: (MCAS New River, NC) CH-53E landing gear inadvertently retracted during ground taxi. (AGM)
- 09 Oct 2018: (Kadena AFB, Japan) Two HH-60H helicopters taxied into each other on the taxi ramp. No injuries. (AGM)
- 30 Jul 2018: (NAS North Island, CA) During hotseat, HH-60H auxiliary fuel tank detached from aircraft and landed on two service members. E-6 died in the hospital, E-5 was treated and released. (AGM)
- 18 Jul 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 Sep 2018: (Atlantic Ocean) E-3 killed when struck by E-2C propeller on deck of CVN. (AGM)
- 21 Feb 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 Aug 2017: (NW of San Clemente Island) MH-60R lost SONAR transducer at sea. (FRM)
- 11 Jul 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 Jun 2017: (MCAS Miramar, CA) Two Marines injured and F/A-18A damaged after flammable material in drip pan caught fire. (AGM)
- 19 Jan 2017: (NAS Norfolk, VA) Three E-2C aircraft damaged in an engine oil related event. (AGM)
- 18 Dec 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 Dec 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

Daniel L. Nega
Depnty Assistant Secretary of the Navy (Air Programs)

Mr. Daniel Nega currently serves as the Deputy Assistant Secretary of the Navy (Air Programs) (DASN (AIR)), where he has been assigned since February 2018. He is the principal advisor to the Assistant Secretary of the Navy for Research, Development and Acquisition (ASN (RDA)) on matters relating to aircraft, cruise missiles, air-launched weapons, airborne sensors, avionics and related ancillary and support equipment. DASN (AIR) monitors and advises the ASN (RDA) on programs managed by the Naval Air Systems Command, the PEO Tactical Aircraft Programs, the PEO Air ASW, Assault and Special Mission Programs, the PEO Unmanned Aviation and Strike Weapons and the Joint Strike Fighter. The DASN makes programmatic recommendations and technical development recommendations, conducts independent studies and analyzes industry capability for production and repair of aircraft.

In his previous assignment, Mr. Nega served as Director of the Naval Air Systems Command (NAVAIR) Cost Estimating and Analysis Department. He was responsible for all aspects of cost estimates and cost-related analysis for programs under the cognizance of NAVAIR and NAVAIR affiliated aviation Program Executive Offices (PEOs). He served as the Department of the Navy's authority on naval aviation acquisition life cycle cost estimating and analysis. He also served as an authoritative technical consultant on naval aviation acquisition life cycle cost, and matters concerning the historic, current, and emerging trends in the aviation industry.

In June 2009, Mr. Daniel Nega was selected to the Senior Executive Service to serve as the Director of the Aviation Readiness and Resource Analysis Department, within NAVAIR's Logistics and Industrial Operations Group. He served in this role until October 2014, where he was responsible for analyzing the impacts of logistics elements, characteristics of weapon systems, and operational deployment patterns on Naval Aviation readiness. The Department's products include readiness & resource assessments, aviation maintenance information systems, technical data and total asset visibility.

Prior to his selection, Mr. Nega was the division manager responsible for leading a national staff of professionals that provided analytical tools, processes and techniques to analyze logistics data to develop optimized solutions in support of Naval Aviation readiness at reduced cost. He is a plank owner of the Naval Aviation Enterprise.

Earlier in his career, Mr. Nega served as a Competency Manager within NAVAIR's systems engineering organization, leading a team of professionals who successfully executed all aspects of mass properties engineering in support of Naval Aviation programs. He was directly responsible for the successful mass properties engineering of two aviation development programs, the MV-22 and the F/A-18E/F.

Mr. Nega earned his bachelor's degree in aerospace engineering in 1986 from the University of Michigan. He is a graduate of NAVAIR's Senior Executive Management Development Program and a member of the Acquisition Professional Community. During his career, he has received numerous awards and commendations, including the Department of the Navy's Meritorious Civilian Service Award and the Presidential Rank Award for Meritorious Executive.

Lieutenant General Steven R. Rudder
Deputy Commandant for Aviation

Lieutenant General Steven R. Rudder assumed his current position as the Deputy Commandant for Aviation, Headquarters Marine Corps in July 2017. LtGen Rudder is a native of Canton, CT, and was commissioned as a Second Lieutenant in June 1984. LtGen Rudder previously served as the Director of Strategic Planning and Policy (J5), U.S. Pacific Command.

LtGen Rudder's previous assignments include: Serving in Co B, 3rd Amphibious Assault Battalion; Student, NAS Pensacola, FL, designated a Naval Aviator; HMT-303, AH-1J helicopter training; HMLA-367, Maintenance Quality Assurance Officer and Weapons and Tactics Instructor; unit deployments to Futenma, Okinawa, and Operations DESERT SHIELD/ STORM; HMM-161 (REIN), Weapons and Tactics Officer deploying with the 11th MEU(SOC) back to North Arabian Gulf; AH-1 Division Head, Marine Aviation Weapons and Tactics Squadron One; Operations Officer, HML/A-167; Future Operations Officer, deploying with the 22nd MEU(SOC) to EUCOM and CENTOCM AOR, HMM-261(REIN); Office of Net Assessment, the Office of the Secretary of Defense serving as Mr. Andrew Marshall's Military Assistant; Squadron Commander, HML/A-167 deploying to EUCOM AOR in support of Dynamic Mix; Senior Watch Officer, OIF, 3rd Marine Air Wing Tactical Command Center; J5 Lead planner for Afghanistan and Pakistan, CENTCOM, Tampa, FL; deployed to Afghanistan, Pakistan and Qatar in support of Operation ENDURING FREEDOM; Commander, Marine Air Group 26, deploying to Al Asad, Iraq, in support of Operation IRAQI FREEDOM 9.1; Branch Head of Aviation Expeditionary Enablers (APX), Headquarters Marine Corps Aviation; Legislative Assistant to the Commandant, Headquarters Marine Corps, Office of Legislative Affairs; Commanding General, 1st Marine Air Wing, Okinawa, Japan; deployed Wing to Thailand and South Korea.

LtGen Rudder holds a Bachelor of Science Degree in Business Administration from Boston University, a Masters of Military Studies Degree from the Marine Corps Command and Staff College, and a Masters of Strategic Studies from the United States Army War College.

Personal decorations include the Defense Superior Service Medal, Legion of Merit with Gold Star, Distinguished Flying Cross with Combat 'V', Defense Meritorious Service Medal with Gold Star, Meritorious Service Medal with Gold Start, Air Medal Strike Flight 4, Navy Commendation Medal with Gold Star and Combat 'V', Joint Achievement Medal and Navy Achievement Medal.

Rear Admiral Scott D. Conn
Director, Air Warfare, Office of the Chief of Naval Operations (OPNAV N98)

Rear Adm. Scott Conn is a native of Lancaster, Pennsylvania, and a 1985 graduate of Millersville University of Pennsylvania. He was designated a naval aviator in May 1987. Conn is also a graduate of the Naval War College.

Conn's command tours include Carrier Strike Group 4; Naval Aviation Warfighting Development Center; Carrier Air Wing 11; the FA-18 series Fleet Replacement Squadron (FRS) Strike Fighter Squadron (VFA) 106; and VFA-136.

Conn's sea tours involved seven deployments on five different aircraft carriers in support of Operations Deliberate Force, Southern Watch, Deny Flight, Enduring and Iraqi Freedom. He has flown in excess of 100 combat missions, has accumulated over 4,700 flight hours and 1,000 arrested landings.

Ashore, Conn had multiple flying tours involving flight in the A-4, F-5, F-16 and FA-18 series aircraft. His staff tours include serving as the staff general secretary and U.S. Pacific Command (PACOM) event planner at the Joint Warfighting Center; as the executive assistant to Commander, U.S. Fleet Forces Command; and as the strike branch director for Director Air Warfare (N98) on the staff of the Office of the Chief of Naval Operations.

Conn was the recipient of the 2004 Vice Adm. James Bond Stockdale Inspirational Leadership award and is authorized to wear the Legion of Merit (six awards), Defense Meritorious Service Medal, Meritorious Service Medal, Air Medal (five Strike Flight), Navy and Marine Corps Commendation Medal (five awards, one with Combat "V") and the Navy and Marine Corps Achievement Medal, as well as various service and campaign awards.

Updated: 7 December 2017

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THE HOUSE ARMED SERVICES COMMITTEE
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES
U.S. HOUSE OF REPRESENTATIVS

STATEMENT OF

VICE ADMIRAL MATHIAS WINTER
PROGRAM EXECUTIVE OFFICER
F-35 LIGHTNING II PROGRAM

BEFORE THE
HOUSE ARMED SERVICES COMMITTEE
TACTICAL AIR AND LAND FORCES SUBCOMMITTEE
U.S. HOUSE OF REPRESENTATIVES

ON

DEPARTMENT OF THE NAVY ACQUISITION AND MODERNIZATION PROGRAMS IN THE FISCAL YEAR 2020 NATIONAL DEFENSE AUTHORIZATION PRESIDENT'S BUDGET REQUEST

APRIL 4, 2019

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SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES
U.S. HOUSE OF REPRESENTATIVS

I

II Introduction

Chairman Norcross, Ranking Member Hartzler, and distinguished Members of the Subcommittee, thank you for the opportunity to discuss with you today how the F-35 has contributed to modernization of tactical aircraft in the Department of the Navy. As adversaries across the globe continue to develop advanced capabilities of their own, this conversation serves as an opportunity to align programmatic expectations and goals while discussing the operational accomplishments that are redefining the battlespace through the acquisition of the world's most advanced fifth-generation strike fighter. This year's President's Budget enables the F-35 Air System and my team to fully support the National Defense Strategy through our role in building a more lethal joint force and through our work to strengthen our alliances and build new partnerships.

The F-35 Joint Program Office (JPO) is leading a continued transformation of the F-35 Enterprise by embracing true agile acquisition processes and transitioning from a developmental and initial production environment to a full-rate production and continuous modernization environment, while sustaining the substantial growth of global operations.

With more than 390 fielded aircraft operating from 16 sites within the U.S. and abroad, F-35 warfighters are beginning to experience the true game changing capabilities the F-35 brings to bear as well as identifying challenges that need to be addressed. Tbrough these efforts, along with the aggressive implementation of cost-saving initiatives, the F-35 will be more survivable,

supportable, lethal, and affordable than ever before and will ensure our expectation for decades of continued U.S. air superiority is reaffirmed.

III Department of the Navy Modernization

The F-35 is more than a fighter jet; it is the "quarterback for the joint force." The F-35's ability to collect, analyze and share data is a force multiplier that enhances all assets in the battlespace. With stealth technology, advanced sensors, weapons capacity and range, the F-35 is the most lethal, survivable, connected and interoperable fighter aircraft ever built. This is true for our United States Services, International Partners, and Foreign Military Sales (FMS) customers, and the U.S. Navy and U.S. Marine Corps are no exception.

The convergence of stealth aviation and maritime capabilities found within the F-35B and F-35C give the U.S. Navy and Marine Corps more combat attack flexibility and an improved ability to fight sophisticated enemy air defenses. This allows aircraft carriers and amphibious assault ships to maneuver and engage threats in highly contested environments when land-bases are not as accessible or are held at risk.

IV Program Successes and Accomplishments

Throughout 2018 and into 2019, the F-35 Program continued to progress across the lines of effort of Development, Production, and Sustainment. Of particular note in the area of development, the Program delivered Block 3F capability last June, completed a series of successful pre-Initial Operational Test and Evaluation (IOT&E) events from January to September 2018 followed by a successful Operational Test and Readiness Review (OTRR) in early October 2018 all of which culminated with the start of IOT&E in December 2018. In

parallel our Block 4 Modernization efforts continued to ensure that requirements for delivering new capabilities are focused on maintaining operational superiority and meet our Warfighter's needs. Our production team saw equal progress with the award of the Lot 11 engine contract in May, the award of the U.S. Services' Economic Order Quantity (EOQ) contract for Lots 12, 13, and 14 hardware in June 2018, and the award of Lot 11 Air Vehicle contract in October 2018. These efforts brought down the unit cost of the F-35A to $89 million, the lowest price to date for the program, and we are continuing to aggressively come down the cost curve. Ninety-one F-35s were delivered during calendar year 2018, a nearly 40% increase from the previous year. In the area of Sustainment, the Enterprise has made great strides to support the F-35 fleet. Specifically, Reliability and Maintainability (R&M) improvements have increased Air Vehicle Availability (AVA) by [~3%] during calendar year 2018. Phase 2 of the Global Supply Solution (GSS) Capability and Capacity stand-up for 2020-2022 has been completed, and the Hybrid Product Support Integrator (HPSI) has supported the rapidly-growing fleet, driving improvements in availability, mission capability, and deployments. Additionally, the Program initiated stand-up of the first Outside-the-Continental-United-States (OCONUS) Air Vehicle Depot in Italy, which inducted its first aircraft in July 2018. These accomplishments, and more, are made possible by the strong partnerships that exist within the F-35 Program, both across U.S. Services and among our International Partners and FMS customers.

Across the F-35 Enterprise these accomplishments demonstrate the Program's commitment to provide an affordable, lethal, supportable, and survivable air system to the warfighter. As the fleet continues to grow and the Air System's capabilities are enhanced, it is crucial that the

Enterprise remains focused on fleet readiness to ensure these capabilities are available to the warfighter. In 2018, the F-35 program completed the most comprehensive, rigorous and safe developmental flight test program in aviation history. More than 9,200 sorties, 17,000 flight hours, and 65,000 test points were achieved to verify the design, durability, software, sensors, weapons capability, and performance for all three F-35 variants.

GOALS for 2019:

In 2019, F-35 flight tests will continue in support of phased capability improvements and modernization of the F-35 Air System. This agile framework, known as Continuous Capability Development and Delivery (C2D2), provides timely, affordable, incremental warfighting capability improvements to maintain air dominance against evolving threats to the United States and our allies.

More than 390 F-35s are currently in the global fleet, which will increase to nearly 500 by the end of 2019 with the planned delivery of 133 aircraft this year (131 for LRIP 11, and 2 from LRIP 10). Production ramp-up will continue as operational testing concludes in the fall of 2019, when the program will also enter full-rate production. To prepare for increased quantities, production experts from across the United States Government are working with our industry partners to deliver quality parts on time and at affordable costs. To achieve efficiencies, the Program has incorporated a number of performance initiatives and incentives across the entire supply chain to support F-35 production lines in Italy, Japan, and the United States. The program is also targeting a threshold On-Time Delivery (OTD) rate of 95%, with an objective of 100% OTD of aircraft to contract. We also plan to award the Lot 12 Air System contract with

options for Lots 13 and 14 in May 2019 and Lot 12 Engine contract in July 2019, in addition to working efforts to further streamline contract negotiations timelines.

Driving down cost is critical to the success of this program and, for the eleventh consecutive year, the average cost of an F-35 was lowered. More specifically, unit costs for the F-35B and F-35C were lowered to $115.5 million and $107.7 million, respectively; representing a 5.7% and 11.1% reduction from previous lot aircraft – making these unit costs the lowest to date. As production ramps up, we are working with industry to implement additional cost saving initiatives. We are also on track to reduce the cost of the F-35A to less than $80 million by 2020—equal to or less than legacy aircraft—while providing 5th Generation warfighting capability.

In order to sustain such a growing fleet, the enterprise is targeting an 80 percent Mission Capable (80% MC) rate by the end of September 2019 for operational units. Additionally, the Program is working to achieve Full Operating Capability (FOC) of its Hybrid Product Support Integrator (HPSI) to sustain a future global fleet operating from twenty-one bases, six countries, four amphibious assault ships (LHDs), and one aircraft carrier (CVN) in 2020. Globally, the enterprise intends to achieve a minimum of eleven depot locations strategically positioned around the world, in order to be able to support a minimum demand rate of repairs as needed.

V Development

While each line of effort is vital to the long-term success of our warfighter, our work to deliver the F-35 weapon system begins with Development. The F-35 continues to establish itself as a vital part of our nation's defense. The Program is currently undergoing Initial Operational

Test and Evaluation (IOT&E) and embracing an agile framework for the Continuous Capability Development and Delivery (C2D2) of Block 4 capabilities which will modernize how we rapidly and effectively deliver technically feasible and operationally relevant capability to the warfighter

SDD Close out: The F-35 Joint Program Office is working towards closure of System Development and Demonstration (SDD) by the end of Calendar Year 2019. This milestone is defined as:

- Delivery of Block 3F capability – completed in June of 2018,
- Completion of IOT&E – projected for 4th Quarter of CY2019, and
- Full Rate Production approval – also projected for 4th Quarter of CY2019, shortly following completion of IOT&E.

Initial Operational Test and Evaluation: On 5 December 2018, following completion of Operational Test Readiness Review, the F-35 Program entered Initial Operational Test and Evaluation (IOT&E) with Block 3F configuration which provides full SDD warfighting capability. As of March 2019, 189 trials have been completed, with 74 trials remaining. Operational Test Trials will continue through this summer and conclude with reporting in late 2019.

Continuous Capability Development and Delivery (C2D2) – F-35 Block 4: The F-35 Program is modernizing how it develops and delivers capability to the warfighter with the construct of C2D2. This approach is a departure from the traditional acquisition framework and delivery of large capability blocks, and implements select agile-based processes that will result in the predictable and timely delivery of software and hardware for rapid modernization, enhancement, and improvement of F-35 capabilities. C2D2 is the method by which Block 4

capabilities will be delivered. Block 4 capabilities are a combination of software upgrades, some which require hardware enablers, and integration of new weapons. These capabilities will provide the warfighter with Electronic Warfare (EW) hardware upgrades, increased processing, Communications, Navigation, and Identification (CNI) upgrades, and Air Vehicle modifications and will be delivered on a six-month cadence. Delivery of these capabilities is dependent on availability of prerequisite hardware upgrades. Each of these components addresses advancing threats while expanding and improving mission capabilities. While the C2D2 approach adds Block 4 hardware and software capabilities incrementally, the foundation of the Block 4 warfighting capability is the modification of the F-35 from its current technology configuration, known as Tech Refresh 2 (TR-2) to a TR-3 configuration.

Beginning in Calendar Year 2022, Block 4 capabilities will require modernization of existing development aircraft currently configured with TR-2 legacy hardware to TR-3. TR-3 replaces the legacy Integrated Core Processor (ICP), Panoramic Cockpit Display (PCD), and Aircraft Memory System (AMS) providing the necessary processing and storage capabilities to realize the full benefit of all Block 4 capabilities while allowing growth for added future capabilities. The production cut-in of TR-3 will occur during Lot 15 in Calendar Year 2023.

The F-35 Program is working to transition to C2D2 faster, more flexibly, and more affordably by breaking down and delivering in smaller increments, ultimately reducing our cost of doing business. There are three aspects to reducing this cost of doing business – agile delivery, capability verification, and open systems. Agile delivery utilizes smaller increments and capabilities so we improve the quality, understand more, earlier, and are able to deliver that

capability to the warfighter. Capability Verification utilizes a combined developmental test and operational test perspective in order to shorten cycle times and get the capability testing from flight test into modelling simulation and labs. Open Systems, specifically regarding TR-3, will allow earlier and easier integration in the near term to get new capabilities on the airplane, and benefit from additional competition. The desired outcome from the C2D2 approach, to Block 4 and into the future, is to deliver technically feasible and operationally relevant capability to the warfighter

Physiological Events and Mitigation Strategy: Since May of 2017, the F-35 JPO has been conducting a multi-Service, multi-Partner investigation and resolution effort to mitigate Physiological Events (PE) in all variants of the F-35. As of March 2019, a total of thirty-seven PEs (thirty-one in flight and six on-ground) have occurred across all variants of the F-35, resulting in an in-flight incident rate of approximately twenty-two PEs per 100,000 flight-hours, similar to other Department of Defense platforms.

While a specific root cause for these events in the F-35 has yet to be identified, specific actions have been carried out in order to reduce and mitigate these PEs, including modifying and improving the On Board Oxygen Generation System (OBOGS), improving the breathing regulator, or Seat Portion Assembly (SPA), and developing a carbon monoxide filter. The first mitigation strategy, modification to the F-35 OBOGS, will provide a more consistent oxygen concentration to the pilot. Initial development has been completed and testing is being conducted. Starting in 2019, new production aircraft will include this capability and retrofit schedules are in work. The second mitigation strategy, improving the SPA, which controls the

pressure of pilot breathing air, will reduce Work of Breathing in back-up mode and fleet fielding schedules are in work at this time. The third mitigation strategy, incorporation of a Carbon Monoxide Catalyst (COCAT), will filter carbon monoxide from pilot breathing air and is slated to begin fielding in fleet aircraft in 2020.

In addition, the Program is making changes to aircrew education and training to better respond to these events. These training changes include updating check lists to identify and implement corrective actions and development of a physiological trainer that simulates the conditions (i.e. pressure, volume, Work of Breathing, etc.) that a pilot would experience with various failures in the F-35 Life Support System.

VI Production

Aircraft production continues to accelerate while the Program aggressively drives costs out of the production line. Efforts such as economic order quantity (EOQ) contracting, and Government-direct purchasing continue to ensure the F-35 is not only lethal, survivable, and supportable, but affordable as well. With suppliers in forty-five states and eleven countries (Figure 1), these are truly global production efforts. Together, with each of our International Partners and FMS Customers, the F-35 Program continues to realize progress and achieve results in terms of delivery performance, pricing, and contracting.

Figure 1: F-35 International Global Supply Base

Delivery Performance: In order to meet increasing schedule demands, the Program will continue to ramp up production while focused on improving quality to support cost and delivery targets. During CY2018, the Program delivered 91 aircraft and achieved the planned delivery goal for the year. As of March 2019, more than 390 aircraft have been delivered and all LRIP Lot 10 deliveries are now complete. The Program continues to ramp up with the planned delivery of 131 aircraft. As of March 2019, 19 of the 131 aircraft for 2019 had been delivered. As for LRIP Lot 11 contract deliveries, 20 of the 141 Lot 11 aircraft have been delivered.

F-35 LRIP Pricing: The price of F-35 aircraft continues to decline. Specifically, the price (including airframe, engine, and contractor fee) of LRIP Lot 11 F-35B ($115.5 million) is approximately 5.7% less than a LRIP Lot 10 aircraft, and F-35C ($107.7 million) aircraft is approximately 11.1% less than LRIP Lot 10 aircraft.

Over the course of the LRIP contracts, timeliness of aircraft deliveries has historically been a challenge. However, in recent years, while production quantities have increased, the Program has seen improvement in the timeliness of aircraft deliveries. Although getting better, the

Program is not satisfied with any delays. To date in 2019, all but one of the LRIP Lot 11 aircraft have been delivered on time.

Air Vehicle Production Contracting: While the U.S. Services continue to contract annually for LRIP Lots 12, 13, and 14, some F-35 Partners and FMS customers have initiated a Block Buy contracting strategy for LRIP Lots 12, 13 and 14. This strategy gives F-35 International Partners and FMS customers the flexibility to purchase all aircraft in a single procurement for LRIP Lot 12 or to procure aircraft and engines in a multiple lot format for LRIP Lots 12 through 14. The U.S. Services are procuring LRIP Lots 12, 13, and 14 as single-year procurements and have requested congressional approval to award a single contract to procure two year advanced material and equipment for FY 2019 and FY 2020. There is no multi-year commitment for U.S. Services' aircraft and engines, which will continue to be bought on an annual basis for LRIP Lots 12 through 14 and preserves congressional annual discretion.

The risk of the Partners' and FMS customers' Block Buy for Lots 12, 13, and 14 is considered low, given the stability of the weapon system's design. All F-35 variants have completed second life (8,000 hours full life) durability testing. Additionally, 99.9% of all hardware and subsystems qualifications are completed, and Block 3F capability began delivery in 2018. For the U.S. Services and Congress, the risk is even lower as the commitment is limited to the purchase of a two-year supply of parts in a single EOQ procurement (FY 2019 and FY 2020).

In November 2018, the F-35 JPO awarded an Undefinitized Contract Action (UCA) to Lockheed Martin for LRIP Lot 12 F-35s for U.S. Services and several International customers.

The contract action obligated $6 billion ($3.5 U.S., $2.5 billion International) in funding from the U.S. Services, our International Partners and our Foreign Military Sale (FMS) customers for a total of 255 F-35 aircraft. F-35 aircraft allocation includes:

-- 106 F-35s for the U.S. Services (quantities are for Lot 12 program of record plus FY18/FY19 aircraft quantity congressional adds)

-- 89 F-35s for International Partners

-- 60 F-35s for Foreign Military Sale customers

This award established a $22.7 billon not-to-exceed contract threshold and contract framework to produce Lot 12 aircraft. This enables the continued production of F-35s while government and industry teams work to reach final contract agreement definitization targeted for the spring of 2019. Contract deliveries of LRIP 12 are scheduled to begin in January 2020.

This Lot 12 UCA framework leveraged our Lot 11 agreement and includes targeted Production Line Performance and Supplier Cost incentive areas. These incentives, when realized, will position the Program to achieve the required increased production ramp and align industry performance to achieve our required outcomes in reducing costs, increasing quality and meeting delivery timelines.

Engine Production: In May 2018, the F-35 JPO awarded the Lot 11 Propulsion contract valued at $2.02 billion. This contract covers 135 propulsion systems for all three variants of the F-35 Lightning II, as well as production installs, tooling, program administrative labor, and Partner unique items. The Unit Recurring Flyaway (URF) price for the LRIP Lot 11 Short Take Off and Vertical Landing (STOVL) propulsion system (including Rolls Royce lift systems) is

$29.19 million, a reduction of 3.39% from LRIP Lot 10 URF. The URF price for LRIP Lot 11 Carrier Variant (CV) propulsion system is $12.66 million, a reduction of less than half a percent from LRIP Lot 10 URF. Both values are below Pratt & Whitney's *War on Cost* commitments. However, the JPO is not satisfied with the small percent decrease from Lot 10 and, as such, is engaging with Pratt & Whitney to review the next wave of *War on Cost* initiatives to further drive cost out of these propulsion systems. Negotiations for LRIP Lot 12 are ongoing and are expected to complete in summer 2019.

ALIS: The F-35 Autonomic Logistics Information System (ALIS) is a key enabler to the platform's operational availability and capability. The Department recognizes that ALIS is presently not delivering capabilities the Warfighter needs. To correct these issues, the Department developed a plan to stabilize and add critical capabilities to the current version of ALIS. This plan mitigates risk while the Department charts a path for the future of ALIS, which will leverage lessons learned and apply agile software development techniques to produce a version of ALIS that delivers better readiness at a lower cost.

Upcoming Actions: The F-35 JPO is on track to release a request for proposal for our Lot 15-17 production buys this summer using a base plus two-option years contracting strategy. We are continuing to look for ways to implement a Multi-Year procurement strategy based on the F-35's stable design and steady production rate. To date, the return-on-investment provided by our industry partner in regards to a Multi-Year procurement does not support proceeding with this acquisition approach. We fully believe such a multi-year strategy is ultimately the best way for industry to make long-term agreements with suppliers and bring down overall production costs

while improving on-time deliveries. Therefore, we will continue to work with our industry partner and Department leadership to pursue a multi-year strategy as we move forward so that we can optimize our production program and continue the trend of reducing costs across all F-35 variants.

Ejection Seat Modernization: The F-35 program introduced the final standard of the US16E ejection seat in LRIP 10 in May of 2017. This configuration of ejection seat incorporates a pilot weight selection capability and a fabric panel on the parachute risers to control head motion. These features work together with a lightened helmet to allow the full weight range of 103 to 245 pound pilots to safely eject from the F-35. These most recent seat improvements join other state of the art technologies previously incorporated into the F-35 escape system, including:

- The F-35B auto-eject system is the first use of an auto-eject system in U.S. aircraft
- The arm restraint system is the first in the U.S. Navy
- The leg restraint system is the first passive system used in the U.S. Navy and Air Force
- The single point water activated parachute harness release system on the F-35 seat is the first of its kind used worldwide
- The inflatable airbag head support is also the first of its kind used on any ejection seat worldwide

The F- 35 program has used modern technology to meet safety requirements more stringent than those used on any preceding tactical aircraft program. Upgrade of the F-35 fleet to the final standard US16E seat is underway and is scheduled to complete in 2020.

VII Sustainment

While development and production efforts of the F-35 Program are central to the creation of the aircraft, they must be matched with equally robust capacity for aircraft sustainment. The F-35 Enterprise continues to work towards improving and maintaining a high-rate of mission

capability across the fleet, and is radically pivoting our approach to software development and sustainment.

80 percent Mission Capable Rate: As the F-35 fleet grows, we must also modernize how we support such a fleet. In order to enable the F-35 Enterprise to achieve the mandated 80% MC rate by September 2019, the F-35 JPO, is working with the three U.S. Services and eight International Partners and has established a four phase plan to achieve and sustain the readiness rates listed in Table 2.

THE ROAD TO 80% MC				
	Phase 1 Sep 19	**Phase 2 Feb 20**	**Phase 3 Jun 20**	**Phase 4 Sep 20**
Operations	80%	80%	80%	80%
Training	15-18 UTE	60%	80%	
LRIP 5+	50%	60%	70%	

Table 2

Phase one is to achieve 80% MC of Combat Coded aircraft and improve training to a utilization rate (UTE) of 15-18 (monthly). Phase two will maintain Combat Coded aircraft at 80% MC and continue to improve training to 60% MC. Phase three will get all Lot 6 and follow aircraft to 80% MC. Phase four will be to achieve 80% MC across the entire fleet.

In order to achieve each of these phases the program has embarked on executing four Main Enablers, each with discrete actions. These enablers are in sync with the broader sustainment plan to improve readiness and reduce costs laid out in the updated F-35 Life Cycle Sustainment Plan. Enabler one is to improve supply chain performance, which will be accomplished by increasing repair capability, accelerating depot repair capability, and accelerating material delivery. Enabler two is to return aircraft to MC status, which will be accomplished by reducing

depot modification span times and eliminating long term down aircraft (31+ days since last flown). Enabler three is to accelerate modifications, which will be accomplished by completing Block 3F modifications and retrofits and accelerating reliability and maintainability retrofits. Enabler four is to optimize unit level maintenance, which will be accomplished with organization level maintenance plan changes.

Depot Activation: Two air vehicle depots have been stood up within the United States. One is located at the Ogden Air Logistics Complex, Hill Air Force Base (AFB) in Utah and the other is located at the Fleet Readiness Center East, Marine Corps Air Station Cherry Point in North Carolina. A third is located OCONUS in Cameri, Italy. In July 2018, the Cameri depot inducted its first F-35. In 2019, three additional OCONUS depots will activate, located in Williamtown, Australia; Nagoya, Japan; and Iwakuni, Japan.

In addition to the air vehicle depots, one propulsion depot has been stood up at the Oklahoma City Air Logistics Complex, Tinker AFB in Oklahoma and established initial repair capability in 2014. This depot has matured in both capability and capacity to meet the growing fleet demand, and now has capacity to meet U.S. Title 10 workload through 2028. The program is also actively engaged in standing up of five additional propulsion depots outside the United States. These depots will be stood up in Australia, Turkey, and the Netherlands during 2020, Norway during 2021, and Japan during 2023.

In addition to the above depots, component depot capability is integral to the readiness of the fleet as it will support the F-35 global supply chain with ready-for-issue components at a rate on par with fleet demand. Currently, the F-35 Program has established Initial Depot Capability

(IDC) for twenty-four of sixty-eight designated Line Replaceable Component (LRC) workloads at U.S. organic depots. IDC consists predominately of fault isolation and "repair by replacement" of subcomponents, and takes approximately four years to complete. Organic depot repair capability will continue to mature over the next eight to ten years until the JPO achieves "repair by repair of subcomponents" capability known as Full Depot Capability. As of 18 March 2019, U.S. organic depots reached Initial Depot Capability for 26 of the sixty-eight workloads. By 2024, U.S. depots will have a “demand-rate” repair capability for all sixty-eight workloads to include adequate facilities, trained labor, current technical data, and repair material on hand to effect efficient repairs. Sequencing of workload activations has been prioritized to have the highest positive impact on known readiness issues, accounting for pending engineering changes and other reliability improvement initiatives.

In June 2018, the Program placed Lockheed Martin (LM) on contract to activate thirteen additional workloads at Military Service Depots (MSD) over the next three years. As more funding is made available within the Program, additional workloads currently scheduled for a 2020 contract action will be pulled into 2019. By the end of 2020, all identified F-35 component workloads will be on contract with LM to activate with an estimated IDC completion of 2024. In parallel to the LRC activation effort, the JPO is initiating activities to develop Shop Replaceable Component (SRC) capability starting in 2019. It is estimated SRC capability establishment will take six to eight years. The JPO will then work with LM and the MSDs to ensure capacity is available to meet fleet demands. This analysis will occur on a two-year cycle beginning in 2019.

Software Modernization: The F-35 Program is pivoting how we view software, creating an effective hybrid of historically separate efforts for Software Development and Sustainment, that we are calling Software Modernization. Over the past few years, it has become clear that focusing on the traditional ways of supporting the software for the program was not supportable and would result in duplicative work and inereased eosts. The sustainment of the full air system, with its software intensive elements is the long-term Aehilles heel of the sustainment effort. As the operational tempo has eontinued to increase, the requirements of the fleet have evolved, and the continuous update cycle for the Air System has driven the need for a strategy to stay ahead of the threat to our warfighters. We must embrace innovation in software modernization, which will result in continuous updates and provide a marked increase in capability, at speeds that have never been seen before.

The Program's goal is to use an affordable Integrated Software Delivery Capability, which combines government organic and industry best performers, creating an integrated partnership between government and industry. This partnership will avoid duplication of effort and resources across development and sustainment, bringing them together technically in order to reduce the amount of touch to software modules and get the capability to the warfighter. Ultimately, this new approach shifts towards viewing the development of software as a service rather than a product that is delivered.

Although challenging, this is an exciting opportunity to deliver capability to the warfighter at a pace that has not yet been seen in other programs. The Program also recognizes the need to continue to consider new ways of working and is looking to have a vision for cloud-based global

sustainment. The aim is not to reallocate work, or take work from one area to another, but to work together to maximize the strengths of all the players to bring corrections and new capability as rapidly as possible to our warfighters.

VIII U.S. Services, International Partners and FMS Customer Operations

The U.S. Services, our International Partners, and FMS customers experienced numerous successes and major milestones throughout 2018, and have continued in 2019. Major accomplishments in 2018 for the U.S. Services included deployment of the first U.S. Marine Corps (USMC) F-35B aboard the USS WASP (LHD 1), deployment of F-35As in a Theatre Support Package to Kadena Air Base in Japan, deployment of F-35Cs aboard the USS ESSEX (LHD 2), and the first F-35B combat strike, in support of Operation Freedom Sentinel in Afghanistan.

Milestones for our International Partners in 2018 included: First Aircraft Arrivals (FAA) for the United Kingdom, Japan, and Australia; declarations of Initial Operating Capability (IOC) for the United Kingdom and Italy; declaration of Initial Depot Capability for the Heavy Airframe MRO&U in Italy; in addition to First of Class Flight Trials conducted aboard the HMS Queen Elizabeth with the F-35B. Also in 2018, training for both Turkish and Korean Maintenance personnel began in January at Eglin AFB in Florida; and training for Turkish pilots began in July at Luke AFB in Arizona. The Israeli Air Force conducted operations with the F-35A. And Belgium became the fourth and newest FMS customer of the F-35 enterprise, signing its Letter of Offer and Acceptance in October 2018.

In 2019, the F-35 Enterprise has already achieved major milestones including declaration of IOC for the U.S. Navy in February, with more to follow, including ship activation for the USS AMERICA (LHA 6) which will arrive in Japan later this year (2019); completion of the third U.S. Air Force (USAF) operational squadron standup at Hill AFB in Utah; and FAA and initial standup of USAF 158th Fighter Wing in Vermont.

Milestones for our International Partners in 2019 include: Denmark and Australia were selected in February as additional locations for MRO&U facilities for components; FAA in country for the Netherlands, Turkey and Korea; declaration of IOC for Norway, and Korea; and Canada is expected to release the full Request for Proposal (RFP) for its Future Fighter in mid-2019. As mentioned, ship activations will increase, as well as depot expansions around the world. In evidence of this, the Netherlands will open their first multi-use Regional Warehouse, receive their first aircraft at Leeuwarden Air Base, and receive delivery of the first Netherlands aircraft assembled at the Italian FACO. Italy is also scheduled to begin pooled training of F-35Bs with the USMC. The F-35 FMS Team is also focused on responding to formal Requests For Proposals from both Finland and Switzerland, with U.S. Government response expected in August and November, respectively. In December 2018, the Government of Japan also formally announced its plans to purchase an additional 105 aircraft (63 F-35As, and 42 STOVL aircraft). With this anticipated purchase, Japan will be the largest international customer of F-35s with 147 planned aircraft. Most recently, the Japan Air Self Defense Force declared Initial Operating Capability (IOC) for the F-35A Air System with the stand-up of the 302nd Tactical Fighter Squadron – Japan's first F-35 squadron.

Future potential FMS customers include Singapore, Greece, Romania, Spain, and Poland with the JPO responding to all official inquiries. The coming year promises to be another of substantial growth and progress across the global F-35 Enterprise.

VIII Conclusion

Thus far, 2019 has already been, and will continue to be, another fast-paced and unrelenting year for the F-35 JPO. The Program continues to make steady and measured modernization, acceleration, and growth efforts across all three lines of effort – Development, Production, and Sustainment – and continues to aggressively tackle known challenges. We are ready for our shift from a development/low rate production environment to a full rate production/modernization-sustainment-full operations environment. Lastly, we will continue to remain focused, with a true sense of urgency, to solve challenges and provide a clear status and data needed to assist our Congressional stakeholders as well as senior DOD and International leadership with upcoming tough priority decisions.

Vice Admiral Mathias W. "Mat" Winter
Director, Joint Strike Fighter Program, Office of the Secretary of Defense

Vice Adm. Mat Winter is a 1984 graduate of the University of Notre Dame with a Bachelor of Science in Mechanical Engineering. He received his commission through the Naval Reserve Officers Training Corps and was designated a naval flight officer in 1985. Winter holds a Master's in Computer Science from the Naval Postgraduate School and a Master's in National Resource Strategy from National Defense University's Industrial College of the Armed Forces. He also received a Level III certification in Program Management and Test & Evaluation from the Defense System Management College.

Winter served operational tours as an A-6E Intruder Bombardier/navigator with Attack Squadrons 42, 85 and 34 making multiple deployments aboard aircraft carriers USS Saratoga (CV 60), USS America (CV 66), USS Dwight D. Eisenhower (CVN 69) and USS George Washington (CVN 73).

Winter's major acquisition tours include assistant deputy program manager for the Joint Standoff Weapon System; chief engineer for Joint Strike Fighter Integrated Flight and Propulsion Control; deputy program manager for the Tactical Tomahawk cruise missile program; and his major acquisition command tour as the Precision Strike Weapons (PMA-201) program manager.

Winter has served flag tours as commander, Naval Air Warfare Center Weapons Division, China Lake/Point Mugu, California; assistant commander for Test and Evaluation, Naval Air Systems Command; PEO for Unmanned Aviation and Strike Weapons; director, Innovation Technology Requirements, and Test and Evaluation; the 24th chief of naval research and deputy program executive officer for the F-35 Lightning II Joint Program Office. In May 2017, he became the program executive officer for the F-35 Lightning II Joint Program Office, leading the Department of Defense's largest acquisition enterprise that is responsible for developing and acquiring the F-35, the most advanced next- generation strike aircraft weapon system for the Navy, Air Force, Marines and many allied nations.

His personal awards include the Navy Distinguished Service Medal, Legion of Merit (three awards), Defense Meritorious Service Medal (two awards), Navy Meritorious Service Medal (two awards), Navy and Marine Corps Commendation Medal (four awards), Joint Service Achievement Medal (two awards), Navy and Marine Corps Achievement Medal, Air Force Acquisition Excellence Award, Southwest Asia Service Medal, Kuwait Liberation Medal and various unit and sea service awards.

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NOT FOR PUBLICATION UNTIL RELEASED
BY THE HOUSE ARMED SERVICES
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

STATEMENT OF

LIEUTENANT GENERAL DAVID H. BERGER
DEPUTY COMMANDANT
COMBAT DEVELOPMENT AND INTEGRATION &
COMMANDING GENERAL, MARINE CORPS COMBAT DEVELOPMENT COMMAND

AND

MR. JIMMY D. SMITH
DEPUTY ASSISTANT SECRETARY OF THE NAVY
EXPEDITIONARY PROGRAMS AND LOGISTICS MANAGEMENT

BEFORE THE

SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

OF THE

HOUSE ARMED SERVICES COMMITTEE

ON

FISCAL YEAR 2020 NAVY MODERNIZATION PROGRAMS

APRIL 4, 2019

NOT FOR PUBLICATION UNTIL RELEASED
BY THE HOUSE ARMED SERVICES
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

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 operations 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 FY 2016 and FY 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 FY 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 FY 2020 following Initial Operational Test & Evaluation. ACV remains on schedule to achieve Initial Operational Capability in the fourth quarter of FY 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 JTLV, 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 out-pace 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 communications 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.

LtGen David H. Berger
Commanding General, Marine Corps Combat Development Command / Deputy Commandant for Combat Development and Integration

Lieutenant General Berger was commissioned as an infantry officer in 1981 following graduation from Tulane University. As a Lieutenant and Captain, he served as platoon commander in 1st Marine Division, and later as Company Commander and battalion Operations Officer in 2d Reconnaissance Battalion during Operation DESERT STORM. He also served as Officer Selection Officer in Roanoke, Virginia.

As a field grade officer, Lieutenant General Berger was an instructor at Marine Aviation Weapons and Tactics Squadron One (MAWTS-1) in Yuma, Arizona; instructor at III Marine Expeditionary Force Special Operations Training Group; and served on the Joint Staff as a policy planner in the Strategic Plans and Policy Directorate, J-5.

Lieutenant General Berger commanded 3d Battalion, 8th Marines from 2002 to 2004, deploying the battalion first to Okinawa, and later to Haiti in support of Operation SECURE TOMORROW. As a Colonel, Lieutenant General Berger commanded Regimental Combat Team 8 in Fallujah, Iraq during Operation IRAQI FREEDOM. While serving as Assistant Division Commander of 2d Marine Division, he was appointed to the rank of Brigadier General. He then deployed to Kosovo, where he served for one year as Chief of Staff for KFOR Headquarters in Pristina. From 2009 to 2011, he served at Headquarters, U.S. Marine Corps as the Director of Operations in the Department of Plans, Policies, and Operations.

In 2012, he deployed to Afghanistan as the Commanding General of 1st Marine Division (Forward) in support of Operation ENDURING FREEDOM.

In July 2014, Lieutenant General Berger was promoted to his current rank and assumed command of I Marine Expeditionary Force and subsequently assumed command of U.S. Marine Corps Forces, Pacific.

On 28 August 2018, Lieutenant General Berger assumed responsibility as the Commanding General, Marine Corps Combat Development Command, and the Deputy Commandant for Combat Development and Integration, Headquarters, U.S. Marine Corps.

In addition to a B.S. in Engineering, he holds a Master of International Public Policy from Johns Hopkins University School of Advanced International Studies, and a M.S. in Military Studies. His formal military education includes the U.S. Army Infantry Officer Advanced Course, U.S. Marine Corps Command and Staff College, and U.S. Marine Corps School of Advanced Warfighting. He is a graduate of the U.S. Army Ranger School, Jumpmaster School, U.S. Navy Dive School, and U.S. Marine Corps Amphibious Reconnaissance School.

Jimmy D. Smith
Deputy Assistant Secretary of the Navy
For Expeditionary Programs and Logistics Management

Mr. Jimmy D. Smith assumed the responsibilities of DASN(E&LM) in March of 2017. He serves as the principal advisor to the Assistant Secretary of the Navy for Research, Development and Acquisition on matters related to expeditionary capabilities, satisfying urgent warfighter needs and acquisition logistics. The programs he oversees includes U.S. Marine Corps ground programs and Navy expeditionary programs involving combat vehicles, explosive ordnance disposal, counter- improvised explosive detection, and multiple other programs that support naval expeditionary forces.

Before this current assignment, starting in 2013, Mr. Smith served as the Director for Integrated Nuclear Weapons Safety and Security within the U.S. Navy's Strategic Systems Programs. In this capacity, he was charged with the safekeeping of nearly 70% of this Nation's nuclear arsenal. He executed the Director of Strategic Systems Programs technical authority by providing nuclear safety and security policies and direction to more than 4,500 government and industry personnel. He also oversaw the U.S. Navy's nuclear weapon inspection and nuclear personnel readiness program to ensure that only qualified and appropriate personnel were ever allowed in close proximity to these weapons. During his tenure, Mr. Smith delivered the U.S. Navy's first and only underground nuclear weapon production and storage facility and awarded the first life cycle support contract for the nuclear weapon safety and security program.

Prior to the above mentioned assignment, starting in 2010, Mr. Smith served as the Director for the Above Water Sensors Directorate within the Program Executive Office for Integrated Warfare Systems. There he led efforts focused on planning, developing, acquiring, testing, and sustaining cost effective warfare systems for U.S. Navy surface ships and submarines. Those systems include: the AEGIS combat system; a full-spectrum of shipboard sensors including sonar, radar, and electronic warfare systems; missiles; guns; ammunition; and countermeasures. In addition, Mr. Smith served as the Chief Technology Officer and oversaw the transition of new naval capabilities and technologies into more than 150 Programs of Record. In a collateral capacity, he served as the lead for the Naval Sea Systems Command's Student Engagement and Outreach Program. Those efforts focus on promoting Science, Technology, Engineering and Math (STEM) for grade school students and furthering academic pursuits of college students through scholarships and student employment opportunities.

Mr. Smith was selected for Senior Executive Service in March 2010, after 19 years of federal service.

Prior to his senior executive-level selection, Mr. Smith served as the Deputy Executive Director for Undersea Technology. He was responsible for transitioning numerous science and technology projects from industry, academia, the Office of Naval Research, and the Defense Applied Research Projects Agency into submarine acquisition programs for current-day and future operational use. In a collateral capacity to this role, he served as both the Deputy Program Manager and Research & Development Manager for the OHIO Replacement Submarine Program. There he developed the program's initial research and development plan, long range budget, and the acquisition strategy for the U.S. Navy's newest class of ballistic missile submarines.

In 2005, he served as the Director for Submarines and Strategic Systems Programs, in a dual capacity, on the Secretary of the Navy's staff. In years prior, Mr. Smith held several technical

and managerial positions within the Naval Sea Systems Command and the Program Executive Office for Submarines with distinction. Most notably, in 2003, while serving as the Construction Manager for the first seven submarines of the VIRGINIA Class, Mr. Smith led all submarine construction and acceptance testing efforts. Achievements included the satisfactory completion of the first submarine's construction phase, four highly successful at-sea tests were conducted, and in October 2004 the first submarine of the class - USS VIRGINIA (SSN 774) - was delivered to the U.S. Navy under Mr. Smith's leadership.

Mr. Smith received a bachelor's of science degree in mechanical engineering, in 1990, from Tuskegee University. Graduate-level studies include Environmental Engineering, Marine Engineering, and Business Management. He also possesses four executive leadership certificates from the Cornell University School of Industrial and Labor Relations and two other leadership certificates from the University of North Carolina at Chapel Hill--Kenan-Flagler Business School.

Honors and Awards include: Two Navy Superior Civilian Service Awards, Two Navy Meritorious Civilian Service Awards, the 2016 Black Engineer of the Year Award - "Stars and Stripes Award Winner", and the Blacks-In-Government Department of Defense Civilian Meritorious Service Award.

Other achievements include: Department of Defense David Packard Acquisition Excellence Award and thirty-two other awards and recognitions for outstanding performance and leadership over his esteem career.

Along with being a member of the Department of Defense Acquisition Professional Community, Mr. Smith possesses three Defense Acquisition Workforce Improvement Act Level III certifications. Those certifications are held in the areas of Program Management, Test & Evaluation, and System Planning, Research Development & Engineering.

Updated 05/2017

WITNESS RESPONSES TO QUESTIONS ASKED DURING THE HEARING

April 4, 2019

RESPONSE TO QUESTIONS SUBMITTED BY MR. NORCROSS

General RUDDER. On 29 Mar 2019, PMA–261 and Sikorsky reached a handshake agreement for the combined contract award of CH–53K Lots 2 and 3. Targeted award is slated for early- to mid-May. Negotiations resulted in a favorable position for the Government with several contract terms that will reduce both the Government concurrency risks of the development and production programs and potential retrofit costs. The aircraft quantity was negotiated for 12 vice 14 aircraft due to cost growth identified during Lot 1 production as well as the cost of known technical deficiencies due to development and production concurrency. The lower quantity will allow the program to afford the aircraft while preserving planned support efforts within the budget and program schedule. Aircraft Contract Line Item Numbers (CLINs) will be Fixed Price Incentive, providing a firm target. Negotiated target profit is lower than typical, at 10.3% average across multiple CLINS. A more favorable overrun share ratio of 40/60 for the Government accounts for the recurring risk of 126 known technical issues, and a 30/70 underrun share incentivizes the Contractor to drive down costs. The negotiated ceiling is 121%. A gated process will not be required on this contract as risk and incentives will be managed inside the contract structure and the agreed-to concurrency clause. The concurrency clause includes the correction of 126 deficiencies that are required for a deployable configuration. The Contractor will cover recurring costs of any configuration changes (beyond 126) discovered during developmental efforts and required for the deployable configuration, up to $5M per aircraft. [See page 28.]

RESPONSE TO QUESTION SUBMITTED BY MR. BANKS

General RUDDER. The F–22 CAPE less Indirect Support CPFH in FY17/18 was $ $70,035 and $61,993, respectively. These values are placed in "then year" dollars. [See page 18.]

RESPONSE TO QUESTIONS SUBMITTED BY MR. WITTMAN

Mr. SMITH. The Marine Corps adopted the M855A1 Enhanced Performance Round (EPR), a 5.56mm munition, for the War Reserve Munitions Requirement to align with the Army. The full requirement has been procured and deliveries will continue through FY 2021. The M855A1 will replace the Mk 318 Mod 0/1 SOST rounds as soon as logistically feasible. Both rounds offer increased performance over the legacy M855 5.56mm Ball round. There is a joint/combined effort to lighten the load with ammunition. The Marine Corps led this effort by developing a polymer case round for .50 Caliber; the Army is working 7.62mm, and the U.K. is working 5.56mm. The .50 Cal has performed well during testing and qualification and the next step will be conducting user evaluation within our training establishment. Furthermore, the joint team is actively working to reduce the weight of small arms packaging. These efforts combined will substantially reduce small arms weight enhancing logistics and benefit the individual Marine. The Marine Corps is actively working with the Army on the development of Next Generation Squad Weapon capabilities and plans to begin procurement of the weapons and associated 6.8mm ammunition after they are qualified for production. The Marine Corps intends to start procurement in FY 2023, and will field this weapon primarily to infantry. We will maintain 5.56mm weapons/ammunition for the rest of the force well into the 2030's. [See page 23.]

QUESTIONS SUBMITTED BY MEMBERS POST HEARING

April 4, 2019

QUESTION SUBMITTED BY MR. COURTNEY

Mr. COURTNEY. During the period where carrier air wings will have a mix of fourth- and fifth-generation fighter aircraft, how will you specifically manage the maintenance, logistics support, and detailing of aviation maintenance personnel for two very different airframes aboard the relatively small space of an aircraft carrier?

Admiral CONN. A Carrier Air Wing (CVW) is made up of individual squadrons manned with Sailors who are trained, equipped, and qualified to implement maintenance and safety programs allowing squadron aircraft to conduct assigned missions in support of fleet operations. Each squadron deploys aboard the aircraft carrier with requisite spares, support equipment, tools, technical publications and training programs. This is true whether the squadron is comprised of fourth or fifth generation fighter, early warning, or rotary wing aircraft. The U.S. Navy has developed the necessary Concept of Operations to specifically manage the F–35C maintenance and logistics support for the CVNs and integration with the rest of the CVW. New platforms, like the F–35, introduce maintenance and logistical challenges during their early adoption by the fleet. Fifth generation-unique issues such as Low Observable coatings and an increased reliance on electronics, software, and connectivity to conduct the mission are being addressed by the fleet today. Processes are in place and are being exercised to fold in lessons learned from developmental/operational test and initial operational deployment to inform how the CVW will most effectively man, train, equip, maintain, integrate and sustain the F–35C and future fighter aircraft aboard the Navy's aircraft carriers.

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