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HEARING  
ON  
NATIONAL DEFENSE AUTHORIZATION ACT  
FOR FISCAL YEAR 2019  
AND  
OVERSIGHT OF PREVIOUSLY AUTHORIZED  
PROGRAMS  
BEFORE THE  
COMMITTEE ON ARMED SERVICES  
HOUSE OF REPRESENTATIVES  
ONE HUNDRED FIFTEENTH CONGRESS  
SECOND SESSION  
—  
SUBCOMMITTEE ON TACTICAL AIR  
AND LAND FORCES HEARING  
ON  
**FISCAL YEAR 2019 BUDGET REQUEST FOR  
COMBAT AVIATION PROGRAMS**

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## **FISCAL YEAR 2019 BUDGET REQUEST FOR COMBAT AVIATION PROGRAMS**

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HOUSE OF REPRESENTATIVES,  
COMMITTEE ON ARMED SERVICES,  
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES,  
*Washington, DC, Thursday, April 12, 2018.*

The subcommittee met, pursuant to call, at 2:02 p.m., in Room 2212, Rayburn House Office Building, Hon. Michael R. Turner (chairman of the subcommittee) presiding.

### **STATEMENT OF MICHAEL R. TURNER, A REPRESENTATIVE FROM OHIO, CHAIRMAN, SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES**

Mr. TURNER. The hearing will come to order. The subcommittee meets today to review Air Force, Navy, and Marine Corps combat aviation programs in the fiscal year [FY] 2019 budget request.

I would like to welcome our distinguished panel of witnesses. We have Vice Admiral Paul Grosklags, Commander of the Naval Air Systems Command; Lieutenant General Steven Rudder, Deputy Commandant of the Marine Corps for Aviation; Rear Admiral Scott Conn, Director of the Navy's Air Warfare Division; Lieutenant General Arnold Bunch, Military Deputy in the Office of the Assistant Secretary of the Air Force for Acquisition; Lieutenant General Jerry Harris, Air Force Deputy Chief of Staff for Plans, Programs, and Requirements.

I want to thank all of you for your service and we look forward to your testimony here today.

This hearing continues the subcommittee's ongoing oversight of combat aviation modernization. It represents the third hearing of the subcommittee that we have held this year alone on this topic.

Last year when the subcommittee held this hearing on the fiscal year 2018 budget request we heard how years of continuous combat operations and deferred modernization had created a crisis in military readiness.

The Balanced Budget Agreement signed by the President in February and the fiscal year 2018 Consolidated Appropriations Act will help us to provide much-needed stability and relief. Combined with the fiscal year 2019 budget request, the military services should be able to begin digging out of this hole.

Our witnesses today have been asked to identify their top five modernization requirements for the combat aviation portfolio and briefly summarize how this budget request helps to restore full-spectrum readiness.

We also expect the witnesses to articulate how these requirements are aligned with the goals and objectives of the new Na-

tional Defense Strategy. We expect to examine a broad range of issues today that I will highlight later in this statement, but I first want to address some issues brought to my attention by F-35 pilots and maintainers at Hill Air Force Base where I travelled last week.

These pilots were very concerned about their visual acuity during night refueling operations using the F-35 pilot helmet and describe the issue as a safety issue. The pilots also said the Navy pilots conducting night aircraft carrier landings in the F-35C and Marine Corps F-35B conducting night landings on amphibious ships had a similar safety concern.

The maintenance personnel are still very disappointed in the logistics autonomic—there you go, Autonomic Logistics Information System or ALIS. They continue to have to use manual worksheets and workarounds that take time and effort resulting in lower aircraft availability and mission-capable rates, and they also reported that they are not standardized. I would like for each of the witnesses to address how these concerns relate to their areas and strongly urge each of you to work with the F-35 program office to get these items fixed.

I will just briefly touch on a few other key issues that we expect to cover this afternoon. Regarding F-35A production, the subcommittee would like to better understand the rationale for this year's F-35A request, which amounts to 48 aircraft, and why there is no real significant increase given last year's underfunded requirement for 14 additional aircraft.

General Harris, you testified before the subcommittee last year and stated that, quote, "the Air Force needs to increase F-35A procurement to a minimum of 60 aircraft per year as quickly as possible," end quote. I will also note that 3 years ago, the Air Force planned to procure 60 F-35As in fiscal year 2019.

Regarding physiological episodes [PEs], we continue to be concerned by the increased rate of physiological episodes occurring in Navy and Air Force aircraft.

We recognize that work is being done to mitigate these events, but remain concerned about the overall progress that is made in determining a root cause. This is a good opportunity for the witnesses to provide some detail as to how this budget request supports mitigation efforts.

Regarding aviation readiness and strike fighter inventories, it is my understanding the Navy continues to absorb risk in its management of the strike fighter inventory. I understand the Navy has submitted a request for F/A-18 multiyear procurement authorization which if authorized should make the procurement of Super Hornets more efficient and less costly.

Last year, the Navy and Marine Corps continued to fall short of the number of ready basic aircraft. We will look to better understand what efforts are currently underway to mitigate potential strike fighter shortfalls and improve readiness.

Regarding training aircraft, the subcommittee continues to have concerns regarding the overall age of the training aircraft fleet. I believe that if we are fielding fifth-generation aircraft then we should be fielding a fifth-generation trainer. I look forward to hearing an update on the Air Force's next-generation trainer, the TX program.

Regarding munitions, while everyone in the committee is pleased to see many critical munition programs are being kept at maximum production in the budget request, I am concerned that years of underinvestment has created shortfalls in munition inventories that are being exacerbated by current operations. We need to better understand the challenges you currently face with managing munition programs, as well as this critical industrial base.

And finally, let me—let there be no doubt that we are experiencing a crisis in military readiness and that we must address now. More U.S. military service members have died recently in aircraft mishaps over the past year than have died while serving in Afghanistan.

Over the last 3½ weeks we have witnessed a series of aviation accidents where 16 service members have tragically lost their lives. One of the service members was a constituent of mine. Gunnery Sergeant Derik Holley was a 33-year-old enlisted Marine and he was killed while conducting training missions in a CH-53E helicopter, a helicopter that has been in service since the 1970s.

Many of these tragic events are a result of lack of training hours due to constrained resources and/or the current state of aging equipment, all of which resulted from years of underfunding our military, and clearly shows the magnitude of the problem that we are dealing with.

This is why we have fought so hard to raise the Department's topline budget request. We have to do whatever it takes to ensure that our aircraft are safe and that pilots get the training they need.

Before we begin with witness statements, I would like to turn to my good friend and colleague from Massachusetts, Ms. Niki Tsongas, for comments that she would like to make.

[The prepared statement of Mr. Turner can be found in the Appendix on page 33.]

**STATEMENT OF NIKI TSONGAS, A REPRESENTATIVE FROM MASSACHUSETTS, RANKING MEMBER, SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES**

Ms. TSONGAS. Thank you, Mr. Chairman, and welcome to our witnesses. Good to have you with us today. I would like to thank you for being here today to answer questions about the fiscal year 2019 budget request for Air Force, Navy, and Marine Corps aviation-related programs.

Taken together these programs constitute the largest amount of funding in the DOD's [Department of Defense's] procurement and research budgets, so it is important to review them carefully. Overall, it appears that most aviation programs for the three services are well-funded.

The performance of these programs are, however, more of a mixed story, with some programs performing well and some running into difficulties. Before we get into our witnesses' statements and member questions I did want to touch on a few issues of note.

First, the issue of high rates of physiological episodes which Chairman Turner has referenced continues to be a challenge, particularly for the Navy's F-18 fleet. Recently, similar issues have come up regarding other aircraft, including some operated by the Air Force.

The Navy recently provided an update to Congress on its efforts in this area. And I am encouraged by the amount of upgrade efforts underway and the significant progress on T-45 event rates.

However, I remain concerned that event rates for the F-18 remain well above acceptable levels. Hopefully, the many efforts to upgrade airframes that are underway will improve the situation soon.

In the meantime, the committee must decide how to proceed with a request from the Navy to enter into a 3- to 5-year multiyear contract for F-18 aircraft starting in fiscal year 2019. Before committing billions of additional dollars to the F-18, I want to make sure we fully understand the path to reducing physiological event rates to acceptable levels.

Second, I remain concerned with some aspects of the F-35 program. While production costs are down and the initial development effort is coming to an end, much work remains to be done to get the plane the military needs.

Importantly, the detailed schedule and potential cost of the follow-on development or Block 4 also known as C2D2 [Continuous Capability Development and Delivery] effort is still not known, even though the budget request contains almost \$1 billion for this effort.

Finally, I am troubled by the Air Force and Navy's extended problems getting the AIM-120 missile program's production rate up to where we need it to be to meet the demands of potential conflicts.

After years of problems with productions of AIM-120 missile motors, the program's production rate is now hobbled by a critical parts obsolescence problem. While I know the DOD is working closely with the contractor to address this issue, the delays to this vital program are of concern.

I will have some questions in all these areas and look forward to today's hearing. Thank you and I yield back.

Mr. TURNER. Admiral Grosklags, please proceed followed by General Rudder, Admiral Conn, General Bunch, and General Harris.

**STATEMENT OF VADM PAUL A. GROSKLAGS, USN, COMMANDER, NAVAL AIR SYSTEMS COMMAND, HEADQUARTERS U.S. NAVY; LTGEN STEVEN RUDDER, USMC, DEPUTY COMMANDANT FOR AVIATION, HEADQUARTERS U.S. MARINE CORPS; AND RADM SCOTT CONN, USN, DIRECTOR, AIR WARFARE, HEADQUARTERS U.S. NAVY**

Admiral GROSKLAGS. Thank you, Mr. Chairman.

I am going to make an opening statement for the entire Department. So, Mr. Chairman, Ranking Member Tsongas, distinguished members of the subcommittee, on behalf of myself, Lieutenant General Steve Rudder, Deputy Commandant for Aviation, and Rear Admiral Scott Conn, the Navy's Director of Air Warfare, we thank you for the opportunity to appear before you today to address the Department of the Navy's fiscal year 2019 aviation programs budget request.

We believe our PB19 [President's budget for fiscal year 2019] request is well-aligned with and is supportive of the National Defense Strategy, rebuilding our readiness while building a more le-



thal force. Our ability to achieve this alignment is greatly facilitated by the additional budget flexibility provided by the recent budget agreement and the recently enacted fiscal year 2018 budget.

The lethality which naval aviation brings to bear in support of our Nation's interests will be greatly enhanced by the increased procurement numbers for aircraft and weapons, increased investment in the development of new and advanced capabilities, and increased funding of our critical readiness and sustainment accounts. The need to transform our business and acquisition practices is being directly addressed with investments in agile accelerated capabilities-based acquisition, leveraging authorities provided by the Congress in the fiscal year 2016 through 2018 NDAA's [National Defense Authorization Acts], and investment in Naval Aviation Sustainment Vision 2020 which will leverage commercial tool sets and best practices in making fundamental changes to the processes by which we plan and execute aviation sustainment activities.

In support of the National Defense Strategy and to ensure readiness for combat while modernizing and building a more lethal force, specific naval aviation priorities included in the PB19 request include for the Marine Corps: F-35 procurement and sustainment; CH-53K development and continuation of low-rate initial production; Marine air-ground task force unmanned expeditionary capability, also known as MUX; completion of the H1 upgrades procurement; and maintaining the lethality of our legacy F-18 aircraft.

For the Navy, priorities include F-18 Super Hornet service life modernization and procurement of F-18 Block III, F-35s, E-2s, P-8s, CMV-22s and Triton, and development of MQ-25 and our Next-Generation Jammer.

For both services a critical priority is full funding to the PB19 request for all of our aviation readiness accounts including spares.

Now as both the chairman and ranking member noted, I would also be remiss if I did not mention our continuing challenge with physiological episodes. This remains naval aviation's stop safety concern and continues to have our complete attention.

While we have made clear progress in some areas, solutions to the broader problem do remain frustratingly slow. In parallel with pursuit of root causes, we are continuing implementation of hardware, software, and procedural mitigations. We are conducting additional flight testing and system characterization. And following NASA's [National Aeronautics and Space Administration's] independent review of last year, we have a greatly increased focus on aircrew physiology and the operational environment.

Full funding of the PB19 PE specific request is critical to continuation of these efforts. In closing, we thank the subcommittee for your efforts in reaching the current budget agreement and for your continuing support of our sailors and Marines.

We look forward to answering your questions.

[The joint prepared statement of Admiral Grosklags, General Rudder, and Admiral Conn can be found in the Appendix on page 36.]

Mr. TURNER. General Bunch.

**STATEMENT OF LT GEN ARNOLD W. BUNCH, JR., USAF, MILITARY DEPUTY, OFFICE OF THE ASSISTANT SECRETARY OF THE AIR FORCE FOR ACQUISITION; AND LT GEN JERRY D. HARRIS, USAF, DEPUTY CHIEF OF STAFF FOR STRATEGIC PLANS AND REQUIREMENTS, HEADQUARTERS U.S. AIR FORCE**

General BUNCH. Good afternoon. Thank you, Chairman Turner, Ranking Member Tsongas, and the distinguished members of the subcommittee for the opportunity to appear before you today to talk about the Air Force's priorities for fiscal year 2019.

We appreciate your service and the support this subcommittee provides United States Air Force, our airmen, and their families. Today, I am accompanied by Lieutenant General J.D. Harris, Deputy Chief of Staff, Strategic Plans and Requirements.

We have prepared a joint statement and I will provide brief opening remarks, but I would ask that the full statement be entered into the official record. For the past 70 years, the Air Force has been breaking barriers as a member of the finest joint warfighting team on the planet through the evolution of the jet aircraft to the advent of the ICBM [intercontinental ballistic missile], satellite-guided bombs, remotely piloted aircraft, and development of satellites.

In the same timeframe, your Air Force has also secured peace by providing decisive warfighting advantage in, through, and from air, space, and cyberspace. Today's demand for Air Force capabilities continues to grow as the United States now faces a more competitive and dangerous international security environment than we have seen in many generations.

The fabric of our Air Force weaves multi-domain effects and provides our joint warfighters the blanket of protection and ability to project power—power project America's full range of combat capabilities. We are always there.

Today, 670,000 Active Duty, Guard, Reserve, and civilian airmen meet these challenges by defeating our adversaries, deterring threats, and assuring our allies 24 hours a day, 7 days a week, 365 days a year.

With global trends and intensifying pressure from major challenges, our relative advantage in air and space is eroding in a number of critical areas. We are supporting combatant commander requirements in response to growing challenges from Russia, China, North Korea, and Iran, in addition to an ever-present counterterrorism mission in the Middle East and around the world.

In accordance with the new National Defense Strategy, this year's budget request prioritizes long-term competition with China and Russia. The Air Force must build a more lethal and ready force, strengthen alliances and partnerships, and deliver greater, more affordable performance.

Future wars will be won by those who observe, orient, decide, and act faster than adversaries in an integrated way across all domains. With your support of our fiscal year 2019 budget request, the Air Force will drive innovation, reinforce budget discipline, and deliver capabilities with greater affordability at the speed of relevance.

The demand for air, space, and cyber capabilities is growing and our Chief is committed to ensuring that America's airmen are resourced and trained to fight alongside our sister services to meet all national security obligations.

The Air Force seeks to balance risk across capacity, capability, and readiness to maintain our Nation's advantage. I would like to thank the members of this committee for the passage of the fiscal year 2018 budget and the relief of the Budget Control Act restrictions in fiscal year 2018 and 2019. This allows us to relook at some of the tough tradeoffs made between force structure, readiness, and modernization.

Today's modernization is tomorrow's readiness. Readiness is not static. While our forces have been heavily engaged in deterring or addressing counterterrorism, other adversaries have taken the opportunity to invest in and advance their own capabilities. To address ever-narrowing capability advantages, the Air Force needs your support in the form of steady, predictable, and timely appropriations that fulfill our annual budget request.

The Air Force budget request for 2019 builds on the progress we are making in 2018 to restore the readiness of the force, to increase our lethality, and cost-effectively modernize our top priorities.

Sustaining these efforts requires predictable budgets at the requested funding levels. It is critical to ensure we can meet today's demand for capability and capacity without sacrificing modernization for tomorrow's high-end fight against the full array of potential adversaries.

Timely funding of our request allows us to—ability to modernize faster, be ready sooner, and be capable of achieving our National Defense Strategy task in a timely manner.

You asked us to identify the Air Force's top five combat aviation modernization priorities for fiscal year 2019. Today, in this area, the priorities are the traditional big three for the Air Force: the F-35, both procurement—to include procurement, sustainment, and modernization; the KC-46 for the role that it plays in being able to power project; and the B-21.

The other two areas are the next-generation air dominance efforts that we are embarking on and our fourth-generation modifications to keep our legacy fleet flyable and viable and more capable. These efforts are key to our ability to answer the Nation's call when needed.

Like Admiral Glosklags, we are very focused on unexplained physiological events, particularly in the recent T-6 incidents number of increase that we have incurred. We have multiple attack vectors in that area and I will be happy to discuss those in more detail.

As critical members of the joint team represented here today, the Air Force operates in a vast array of domains and prevails in every level of conflict. However, we must remain focused on integrating air, space, and cyber capabilities across all of those domains so that we can project power. General Harris and I look forward to answering questions from the committee this afternoon.

Thank you for your continued support of the greatest Air Force on the planet.

[The joint prepared statement of General Bunch and General Harris can be found in the Appendix on page 67.]

Mr. TURNER. General Harris, do you have an opening statement? Thank you.

Well, gentlemen, I have only one question. And I think it is the most important one of all of the issues that we have been facing. And you don't have to be on the Armed Services Committee and you don't have to have the uniform on to understand that we have a crisis in aviation mishaps. People are dying. Our chairman has made the statement that it is more risky for a service member to be in training and exercises than in combat right now.

This needs to be addressed. As I said in my opening statement, we need to make certain our aircraft are safe and that pilots get the training that they need. General Mattis says that we must prioritize rebuilding readiness while modernizing our force.

How does the budget that we are looking at for the upcoming year address this issue and what do we need to be doing and what will you be doing to address this issue so that we can end the risky nature of these mishaps that are resulting in deaths of our military service members, our men and women?

I will begin with you, General Grosklags—Admiral.

Admiral GROSKLAGS. Yes, Mr. Chairman. Certainly, we are very much aware as you are of the recent mishap trends. And we are working very hard. Now, each one of those mishaps has to be dealt with on an individually unique basis to determine the root cause, and that is certainly our focus on each and every one of those individually to determine the root cause.

Along with that, we are certainly using the funding that we have in the fiscal year 2018 budget along with the request in PB19 to focus on those areas that may influence our ability to reduce the mishap rate in the future.

We know we need to do that, but again each one of those mishaps will have a unique cause and so there is not a universal panacea if you will that we can invest money in a certain spot.

Things that will help us get after the potential causes are making sure that our maintainers have the tools and equipment they need to maintain the aircraft to the best of their ability; making sure that the material condition of those aircraft in terms of spare parts and readiness on the flight line is at an absolute maximum condition; and making sure that our aircrew have the requisite number of hours to make sure they are trained for the missions that they are being asked to fly.

All of those things we will make improvements on based on the additional funding we have received, but again, I can't tie any one of those specific things directly to certainly any of the recent mishaps which we are still investigating or even make a direct tie to the mishaps that we have experienced over the last number of years.

We try to make those linkages every time we have a mishap, identify the root cause. In many cases we do, in all cases that is not possible. But we continue those efforts. So, I guess in wrapping it up, the investments that we are able to make in 2018 and 2019 will certainly help us rebuild some of the foundational things that we have lost over the last 6 or 7 years. And it is certainly our in-

tent to try and reduce the mishap rate based on those foundational elements.

Mr. TURNER. Admiral, I appreciate your dedication to get to root cause, but I don't buy that, that it is merely just individual incidences. If you have vehicular accidents that occur at a particular intersection repeatedly, they each have their own story, but at times there is something wrong with the intersection.

And at this point, we have an aggregate of these mishaps. I think they go to a systemic issue, not just the isolated instances in which they happened and I certainly want as we look to this budget and our oversight that that attention is paid, because this is unprecedented in what we are seeing.

General Rudder, your thoughts?

General RUDDER. We also are looking at each one of the mishaps and certainly the last CH-53 Echo mishap hit home as well. I was in Dover last Friday night with the Secretary of the Navy and that was a tough night for all of us.

When we look at all of these mishaps, we too are looking at the hours. And one of the things we are focusing on for 2019 is just like we did in 2018. We are maximizing our readiness accounts. We are going to—we are giving maximum amounts to our depots, okay, maximum amounts to buy spares. We are getting maximum amounts to our program managers so they can fix the airplanes.

The CH-53 Echo in particular, we are still executing our max [maximum] funds to reset that airplane on both the east and west coast and in a few other areas in the Pacific and up in Oregon. For the modernization it will help us as well. As we are able to—you have graciously given us the funds to be able to not only reset the airplanes themselves, but also buy new and get out of some of these older aircraft.

We have seen some positive movement on the hours. In 2016, we are at 13.5 average for the Marine Corps. In 2017, 15.4, and in both February and March we are at 18.8 and 19.3 is the average throughout the Marine Corps. So, we are seeing some positive trends, but certainly any type of readiness recovery is fragile.

Certainly, the devastating ones, Class A, individually we look at every single mishap and pull apart and we make the corrective actions. One thing that we have seen and I think the article brought out is certainly our Class Cs. We are finding that experience level down in our maintenance departments and certainly our ops [operations] tempo is creating a lot of people towing airplanes into things and doing maintenance practices that may be not in accordance with the experience level we are used to.

And we are addressing that, trying to provide more stability with our enlisted manpower down there by giving them reenlistment bonuses if they have the higher qualifications and stabilizing them in the squadron.

For instance, if you are a collateral duty inspector, a collateral duty QAR, or quality assurance representative, now, you have a separate MOS [military occupational specialty]. And if you reenlist with that designator, you get an extra \$20,000 kicker and you stabilize, you will be in that squadron for another 2 years.

So, I think as an example, we have had 676 Marines, corporals and sergeants and staff sergeants, take that and now we have sta-

bilized that manpower in the garage. But back to your original point, Chairman, each one of these mishaps is hurting and we are certainly addressing each one of those mishaps in case by case basis.

Mr. TURNER. General, I appreciate your detailed answer and the passion which you have about this.

Admiral Conn.

Admiral CONN. Yes, sir. Well we lost two officers off Key West not too long ago. And we can always replace the airplanes, but we can't replace those sons to their families, sons or brothers who, indeed it was a tragic event.

Overall, for our Class A and Class B for the last 5 years, it has been relatively stable, although loss of one life is one too many. And every time we have a mishap, we look hard of what the root causes were. We put the corrective actions in place. We educate our people so we do not repeat those mistakes whether it would be a procedural error, a maintenance error, or whatnot.

We too have seen in terms of the rise in mishaps, majority being into our Class C. And in those Class C in terms of the analysis by the Naval Safety Center, we are seeing far too many maintenance supervisor and maintenance skill-based errors. We need to get back to the basics in terms of ensuring those sailors know how to fix the airplane, but it is not just fixing airplanes in hangars. It is fixing airplanes on flight lines while you are trying to meet a schedule. And then when you put that flight line on an aircraft carrier, with other aircraft turning, aircraft taxiing, jet exhaust blowing, there is a level of experience there and awareness that those sailors need.

And whether or not the reduction in flight hours is not getting those sailors the reps [repetitions] and sets that they need as pilots and aircrew do, I can't answer that directly, but there is appear to be a correlation that we need to get after and provide those sailors the opportunity to do the job we expect them to do in the environment in which they need to perform with the right tools and experience to succeed.

Mr. TURNER. Admiral, thank you for your answer.

General Bunch or Harris.

General BUNCH. I will go first. I will hit a couple of modernization things and I will hand it over to General Harris to go into some of the other details. Safety is our number one priority. The safety of our aircrew is critical and we need to take every step we can to keep them as safe as possible.

This is a risky business. We don't need them having undue risk though, we need to make sure we are doing those things. We are putting a lot of work into the program offices to make sure we are focused on giving the aircraft, making them available, attacking sustainment issues to keep the fleet viable and provide the aviators the opportunity to fly and get the training that they need and be sure that they are proficient and make sure that we are able to turn aircraft.

Each case is, [inaudible] in a platform, an incident is its own incident. It has to be investigated as has been said previously. As we identify those things though, we work with the program offices to

aggressively and rapidly address those actions that have been identified that we need to take steps on.

A couple of areas where I think it shows that we are trying to move more forward in that. We have recently worked with the JPO [joint program office] and the Navy has worked with us. We are pulling auto [automatic] ground collision avoidance system to the left in the F-35 because collision with the ground is a key area. That is a program that we have got funded and we are getting started that we are moving forward to take that step. In the F-16, the post Block 40 F-16s, we have had seven times that has activated to save aircrew, eight lives we believe have been saved thus far. And we are trying to make sure we get that into the F-35, our newest fighter.

The other one that I would bring up in that area is we are working on the pre-Block 40s. Those are the older versions of the F-16s that many of our Reserve Components fly, as well as some Active Duty units.

We are entering into a program to get that mod [modification] put into that system, to get it out into the field in the future and try to make sure we are taking that which is one of our biggest reasons as a ground collision that we are trying to take that out of the equation to make our fighter aircraft safer.

General HARRIS. Chairman Turner, sir, thank you for your question, for highlighting our shortcomings in this area. Safety is our number one concern and readiness has been the focus of where our Chief, General Goldfein, and Secretary Wilson are taking us.

To that end, we have aligned our fiscal year 2019 budget request with both the National Defense Strategy and our readiness efforts to make sure that we can accelerate what will be a multiyear climb to get back to being ready.

Those scenarios will drive our airmen into scenarios for the high-end conflict that can actually be tougher than the conflict we are in today, but that doesn't explain all the training accidents we have which are coming across, some from inexperience, but some from some of our highest qualified aircrew, and we suffer with each one of those losses.

Our readiness recovery strategy is focused on disciplined investments that cover our critical skills availability, so our people, training resource availability, the things they train with, the weapons support systems, so across the WSS to make sure that they—the aircraft have the parts and that they are ready to go, our flying hour program to make sure that each one of the airmen are flying the hours they need to stay not just to be current, but to be proficient in the missions we are assigning them to.

And then also on the policy side, sir, the ops [operations] tempo and the training to make sure that the people get the time they need to both prepare to fly, to fly, and then also have the downtime that they need. So, we are working on that.

From our perspective, we appreciate the support that you have given us in both an increased budget with 2018 and we are hopeful that you are supportive of our growth, because with readiness our number one concern right now is our people. We don't have enough airmen doing the job that we have got doing so the growth is get-

ting at the readiness. And we are also stepping out in the budget to recapitalize and modernize the fleets across what we are doing.

Thank you, sir.

Mr. TURNER. Ms. Tsongas.

Ms. TSONGAS. Thank you. I think you can see that the chairman and I share a real concern about the safety of aircrew and that's why we are so concerned by some of the numbers. And I wanted to turn our conversation to the efforts related to the physiological events that have been of such concern to this committee.

From our briefings, we know that numerous efforts are underway to reduce that rate of physiological events in the F-18 fleet, specifically the Navy is modifying the software for the environmental control system, installing upgrades to deal with icing in some fluid lines, redesigning two pressure valves, developing a cabin monitoring system, and installing an upgraded emergency oxygen system. However, I think there are some other efforts underway that I wanted to ask about.

Admiral Grosklags, what is the status of designing a new on-board oxygen generation system? How do you imagine the timeline for getting the first one fully tested, and what are the challenges?

Admiral GROSKLAGS. There are two efforts going on right now that are related. The first is for the T-45 actually and we are calling that as a GGU-25. Excuse me. It is a replacement for the one they have now. It is largely intended as a reliability replacement with some improved performance.

But it also provides a response to one of the key NASA recommendations, was that we provide an oxygen scheduling, oxygen concentration scheduling capability in our Navy aircraft, which we do not have in any of our tactical platforms today. That will take us partway to answering that NASA recommendation.

The next step, which is a combined T-45 and F-18, is to get to a mil standard [military standard] 3050. That is a very recent 2015 mil standard to get to a 3050 compliant oxygen generation system. That is something that we are going to compete between the two companies that are out there that do oxygen generators because today there is not a system on the shelf that meets that new mil standard. So, we want to see what both of them have to bring to the table.

For the first effort, we believe we will be able to start installing that in our aircraft late next year. It will be the following year, depending on what we get back from industry, it would likely be the following year, so 2020 before we can get that new mil standard compliant oxygen generator.

Ms. TSONGAS. Along those same lines, where is the Navy with the plan to install the cabin pressure and oxygen monitoring system and when will that—similarly, what would the timeline be for that?

Admiral GROSKLAGS. Right now, the timeline for getting that into our F-18s is the third quarter, so about a year from now, third quarter of 2019. In the interim, what we are actually going to do is install in a limited number of aircraft the same monitoring system, the CRU-123 that we put in the T-45s. That is not a good long-term solution for the F-18s, but it will start to again provide us some information like we are getting from the T-45s that will



hopefully get us to some of the root cause of what is going on in the aircraft.

Ms. TSONGAS. And the Air Force F-16s have had an automatic ground collision avoidance system for many years. And we know it has saved many lives and in the past the Navy has resisted efforts to install a similar system on the F-18. Where is the Navy on this issue today given the track record that is demonstrated in the Air Force?

Admiral GROSKLAGS. I will let Admiral Conn answer that.

Admiral CONN. I will answer that. For the automatic recovery for terrain avoidance is something that could be put in the airplane, right now it is not funded. From a physiological episode, that is not what it is designed to do. We have not had a controlled flight into terrain in the F-18 E or F in its lifespan. But it is something that we will continue to reevaluate whether to put that capability in the aircraft. Thank you.

Ms. TSONGAS. Thank you. And then in previous briefings and hearings on this topic, we have been told that the Marine Corps fleet of relatively old F-18 aircraft are not experiencing the high rates of events that the Navy's older F-18s have.

So, General Rudder, is that still the case? And if so, how do you explain it? Are there maintenance, operational, or reporting differences between the Navy and Marine Corps aircraft?

General RUDDER. No. Thank you, Congresswoman. We are tracking this right along with the Navy and I believe if "Clutch" Joyner tells us to do something, we do it and we jump and do it. We are in step with the reporting procedures.

This year, we have had only one in the F-18 and two in the Harrier. In years prior, most of our events have been pressurization issues in the older F-18 and we have reported and go through all the protocols that do that.

I can't answer it exactly. I think if you look at the numbers, sometimes they get skewed with the training command and operational units and just where units are in the pipeline. But I assure you, whether it is a slam stick, excuse me, slap stick or sorbent tube, whether it is working through the simulators, we are right in step with the Navy and everything has to do with PE. But I don't have a great answer for you, but this year we are having another very low year with the F-18 so far, knock on wood, with just one F-18 event.

Ms. TSONGAS. Well, that is good news as long as it is the case that the reporting is essentially the same.

I have another issue related to the F-35. Yesterday, there was a press report stating that DOD has stopped accepting deliveries of F-30 aircraft from Lockheed Martin due to a dispute over who will cover the cost of production errors in 2017 involving more than 200 aircraft. In the story, Lockheed Martin confirmed that deliveries have been suspended. So, I have several questions about this report for General Bunch and General Grosklags. Is the report accurate? Is this report accurate?

General BUNCH. So, ma'am, I will start and I will let Admiral Grosklags pick it up. It is a pause. I would not say it is a complete stop. There have been 14 of the Lot 10 aircraft that have been delivered. There are a total of five aircraft that have not been accept-

ed at this time, three of those are Air Force aircraft, one of those is from Norway, and one of those is from Australia.

Those are aircraft that the program executive officer, within his authorities, has made that decision in coordination with Ms. Lord to make sure they knew what we were doing to address this quality issue and we do not see it as a long-term problem. And if we have an operational need for the aircraft, we have discussed with Admiral Winter and he is willing to entertain the idea and willing to work with us that if we need the aircraft for an operational need, we will work with him to get those aircraft out of the hold that they are on right now.

Ms. TSONGAS. And then what is the production defect in question? What is the issue here?

General BUNCH. Ma'am, it goes back to a corrosion prevention in one of the holes that was drilled that was not corrected, properly treated that was found during inspection at Hill Air Force Base. And we are now working through how that made it out of the factory and what we were doing to try to get that rectified in the fleet.

Ms. TSONGAS. And why is there any question or dispute as to who is going to pay to fix it?

General BUNCH. Ma'am, that is why I am letting Admiral Winter work that with the company and he is carrying our water in that area.

Ms. TSONGAS. Admiral Grosklags, so, yes, the report is accurate. We know the defect. Anything you want to add?

Admiral GROSKLAGS. Let me add. I agree with everything General Bunch said. We know what the technical solution is. This is purely about who is responsible for the cost. And I agree with Admiral Winter's decision at this point in suspending delivery of those aircraft. Quite honestly, this is a mistake made by the contractor during production and they should pay for that out of their bottom line, not our top line.

Ms. TSONGAS. Thank you both.

And I yield back.

Mr. TURNER. Our questioners next are Cook, Gallego, and McSally.

Mr. Cook.

Mr. COOK. Thank you very much, Mr. Chairman.

This morning, we had General Mattis here and I asked him some questions about the F-35 and it is kind of in line with what we are talking about, and this was about you know our allies, so-called allies, that are purchasing F-35s. And, of course, the Canadians backed out of their deal and then the question is about the Turks. And there is people on this committee and certainly the Foreign Affairs Committee that are concerned about the sale to the Turks and how this would inflate the overall cost of the F-35, which every year that I have been in Congress we are always talking about this is a big ticket item.

And I think we have come a long, long ways, and unless we get this foreign military sales or anticipate what is going on on this, we could have maybe they are not quite similar scenarios, but I think you see what I am getting at.

The general was very diplomatic in how he handled that question. I wasn't so diplomatic as I have some issues with the Turks,

but that could be a very real-world scenario. Any comments on that or you want to duck that one? It is kind of a political foreign affairs, but it affects the overall price based upon what certain allies do. Do you have a contingency plan in place?

Mr. TURNER. Perhaps I can help, but perhaps and if you could speak to the importance of our foreign partners both in contribution of parts and in overall cost.

General BUNCH. So, sir, overall this has been a unique program from the very beginning as we formed it with allies who invested all the way along. They have been there for the entire development and we have done it in a completely different manner than we have done previous programs.

There is no other program that I am familiar with in my experience. Admiral Grosklags may have a different history than mine where we have had the partners in as voting members from the very beginning and contributing so much to the development of a platform.

So, if they pull out or if something changes in those scenarios, there would be an impact to us. Each country contributes a certain percentage. We would have to go back and look at those percentages. They have a certain number of aircraft they are supposed to buy in certain years. And we would analyze that and then we would make decisions on how we, the U.S. Government, will work with the other partners to make up any differences in how we would go forward, because this is a critical capability that we, the United States Air Force, are counting on for our ability to execute our mission for the future.

Mr. COOK. Thank you, General.

Going back to the F-35s, and General, we have broached this subject with the Marine Corps about operating in an expeditionary mode. And recently I was at Twentynine Palms and that is an expeditionary airfield. And there was, the wind kicked up and then the dust storm kicked up. And I remember the last time I was there, there was an MV-22 and, I mean, it was like Cook goes back in history to when he was infantry in Vietnam and the sand and all that crap.

And I am thinking, how is this \$100 million aircraft going to exist in that environment, which is very comparable to the Middle East, Afghanistan. You pick a country there and the climate. I am very, very worried about that because maintenance, maintenance, maintenance just might be overcome by elements, elements, elements.

General RUDDER. Thank you, Congressman. And we actually did take the F-35B up to Twentynine Palms and we put the ALIS system in a tent and we operated it out of that. And actually we almost lost a tent because of the dust storm up there. The Marines held it down like good Marines and we were able to continue to operate.

Because we built the STOV [short take-off and vertical landing] model we are going to continue to operate that in an expeditionary manner. In fact, our concept, that you are probably well aware of, the expeditionary air base concept, that is how we are going to survive in the future.

And just recently having our first six F-35s on the USS *Wasp*, we just executed some of these expeditionary distributed STOVL operations off that ship into a land-based system keeping the airplane running, fueling it off an MV-22, hot-loading it with a weapon system and then taking right back off again into the fight. So, we are going to continue to maneuver that concept and look for ways to enhance that ability to operate in these austere environments.

Mr. COOK. Thank you, General. And I am optimistic, I am just saying you are a lot younger than I am. And I don't want a repeat occurrence of the Harrier at Camp Lejeune, North Carolina, which it is going to land there where a phone call had to go to the Marine Corps base so you could have the sweeper out there on Limon Road so we wouldn't have any dust and particles. And then when that happens in Twentynine Palms, you are going to hear from me I guess, but thank you very much. I am optimistic, but I am always nervous about it.

Thank you, Mr. Chairman.

Mr. TURNER. Mr. Gallego.

Mr. GALLEGO. Thank you, Mr. Chair.

In this committee and other, the full committee, we have talked a lot about something I think that particularly scares me, a concern that we have some adversaries that could take advantage of this, is the lack of munitions in our stockpiles specifically because we are drawing so much of our munitions out of—for CENTCOM [U.S. Central Command] that we are probably diminishing in other areas.

So, I guess my question is can I just get an update on where we are in terms of our stockpiles in munitions? You could go by areas if you want. And also do we have sufficient stockpiles for example, in Asia right now, should something, should the balloon go up?

General BUNCH. So, sir, Congressman, that is a great a question. What I will do is give you a top level of what activities we are trying to do to replenish. I am reticent to go too far down—

Mr. GALLEGO. Understood.

General BUNCH [continuing]. Exactly how we are in specific areas for operational reasons.

Mr. GALLEGO. We could talk about that offline, yep.

General BUNCH. We could do that in another forum if you would like. I will talk about two weapon systems in particular for us, Joint Direct Attack Munitions [JDAM] and Small Diameter Bomb I, both of which are weapons that are principally ones that a lot of people are being used and are getting a lot of use today.

Over the last years, we have now ramped up JDAM production in coordination and partnership with Boeing to the rate of 45,000 a year. That is the highest we have ever had that rate. And we are starting to put stockpiles back in and we have got some we can give to, sell to our foreign military sales partners. And there is some excess capacity there Boeing may be able to get out. We just recently got to that level, though, so I wouldn't be willing to commit that we will be able to produce more than that, but we are now up to 45,000 a year.

On the Small Diameter Bomb I, that one is a weapon that when we did the full-rate production decision for the Air Force we were

only producing 3,000 of those a year. Over the last 2 years, we are now up to the point that we are on contract to bring in 8,000 a year. So, we have rapidly ramped that up to increase. That is another one that has been in partnership. So, we are trying to increase those numbers to get those weapons up so that we can rebuild those.

The piece that we have to keep in—that we have to remember and that we stress to our program executive officer and he has done it without us even having to really stress it, you have to take a holistic look at this. For the JDAM, it is not just the tail kit, it is the bomb body. It is the fill material. It is everything associated with getting that weapon to be a weapon, not just a kit. Same with Small Diameter Bomb. And what we have done or I have done is gone to the vendors and said, “If you run into an issue with your subs and they are going to be a problem, I cannot find out about it late. You have to tell us so that we can work as a partnership to get that problem solved so that we can keep weapons going forward because we are expending so many today.”

Mr. GALLEGO. Admiral.

Admiral CONN. From a PB19 perspective for the Navy and under the same restrictions that Lieutenant General Bunch mentioned, for us our investments is just going after some high-end weapons for the high-end fight, LRASM [Long Range Anti-Ship Missile], AARGM [Advanced Anti-Radiation Guided Missile], AIM-9X [Sidewinder short-range multi-mission missile], SDB II [Small Diameter Bomb II], RDT&E [Research, Development, Test, and Evaluation], as well as addressing some of our PANMC [Procurement of Ammunition, Navy/Marine Corps] accounts, our JDAM, APKWS [Advanced Precision Kill Weapon System], and the funding profiles that will get us to that we will call our total munitions requirement on our carriers throughout the FYDP [Future Years Defense Program].

One thing that does not fall into WPN [Weapons Procurement, Navy] is our sonobuoys and we are expending more sonobuoys than we planned for across the globe. So, we need—we would ask your support for all the investments we are making in PB19 for our sonobuoys to include the unfunded list.

Mr. GALLEGO. Have you seen this actually—let us call it shortage. Have you seen this shortage actually have an effect on live fire practice or exercises?

Admiral CONN. For our non-combat expenditure allocation, we are shooting. That is a firm belief we have in naval aviation is the value of live fire end-to-end validation of the weapon system itself. And then the aircrew's ability to execute that or deliver that weapon in accordance with procedures. We have some weapons that are getting ready to demol [demilitarize] and we are going to shoot them instead of demilling them.

Mr. GALLEGO. That is a good idea.

Lastly and this could go for anyone, how comfortable do we feel being able to move munitions from one theater to the other quickly and efficiently should the balloon go up?

General HARRIS. Moving munitions is not an easy task because of the explosives associated with that, so we prefer to pre-position them. And our FY 2019 plan that we started earlier in 2018,

thanks to your help, is already doing that, so we are on a get-well slope right now.

Mr. GALLEGO. Anybody else? I yield back.

Mr. TURNER. Ms. McSally.

Ms. MCSALLY. Thank you, Mr. Chairman.

General Harris, I am talking about the A-10 re-winging, go figure. So, we have had lots of conversations about this with the Air Force leadership. We finally did get the resources to start the production line back up again in the funding bill. It is unfortunate that it closed back down. It is going to cost more in the long run to do it this way.

But either way, in this year's funding bill that is enough for 4 wing sets. The request for next year, we understand, is for somewhere between 8 and 12 wing sets. I know you were told there would be no math, but there is 109 left in the fleet that need to be re-winged. So, at that rate for between this year and next year, that is 93 to go. It is our understanding that Hill's maximum capacity is 32 a year. Is there some other reason why you are not asking for max capacity? Is it because we can't have that many in the fleet that are out for that period of time, just operational requirements? So, that is my first question.

And then how many aircraft will be grounded this year, next year, the year after? Your testimony says that you are asking for the wing program to avoid any further groundings beyond 2025. So, can we get some specifics on how many aircraft will be grounded every year between now and then? And I know some of that is dependent on operational tempo, but I also want to talk about what innovative things can be done to smooth that out, because, as you know, certain squadrons are taking a beating more than others and there are ways to smooth that out. So, there's a lot of questions in there, but it is all about the re-winging.

General HARRIS. Congressman, thank you for the question and for continuing to take care of the A-10 fleet. We do not expect to have any groundings for the A-10s based on the way we are flying them now. And we are rotating those that are close to being grounded into BAI [backup aircraft inventory] status so we can preserve them, so we don't expect in the next couple of years to have an issue with that.

Ms. MCSALLY. Okay.

General HARRIS. We kept the production of new wing sets low. We kept it open with the 8 to 12 wings until we complete our studies. Many have been passed to this committee to make sure that we understand where it is we are going with the profile. So, until we have an answer for that to include the F-35 OT&E [operational test and evaluation] test and comparison we are not going to make a further commitment until we know where we are going with both the A-10 and the F-35. So, we will have to get back to you on a grounding per year, per airplanes, and we will—

Ms. MCSALLY. Okay. So, you said the next few years, but the testimony says to avoid any further groundings beyond 2025. So, are you saying between the next few years and 2025 for sure there is going to be groundings unless something changes? The word "further" is jumping out at me.

General HARRIS. Okay. We are not confident that we are flying all the A-10s that we currently possess through 2025 with our plan. So, as we are looking at our CAF [Combat Air Force] roadmap and where we are going with our modernization program, our intent is not to have groundings that impact the fleet. So, between now and 2025 we are comfortable and, as we said, we will be flying A-10 we expect to the 2030 timeframe and we will make sure that we re-wing enough of the aircraft to have that capability and capacity.

Ms. MCSALLY. So, can I again read into that because I know this is where we do differ, I mean, you have got in the testimony going down to six squadrons where there is currently nine squadrons and, as you know, there are less PAA [primary assigned aircraft] than the old squadrons had. They are down to 18 versus 24 PAA.

From my view, again, for the millionth time, with them being south of the DMZ [demilitarized zone] and deployed to Afghanistan and just coming back from shwacking ISIS [Islamic State of Iraq and Syria], and working with our NATO [North Atlantic Treaty Organization] allies, and all that we have on our plate, three Active Duty and then six Guard and Reserve squadrons for a total of nine, like that is already stretching it for the types of capabilities that they bring to the fight. So, how is it that we would provide that capability to the combatant commanders if we went down to six? I just, I don't see it.

And we obviously mandated 171 minimum combat capability in the last couple of NDAAAs. I expect to fight to continue to have that number in there as long as I am around. So, how does that square itself, because I just—at least you are all agreeing well into the 2030s, which I appreciate and partnering with you on that. But it is the six versus nine that I just think we are still out of sync.

General HARRIS. Okay. Part of it as we go from nine to six if we execute the plan as we are studying right now, we will make the remaining A-10 squadrons healthy back to 24 PA [primary aircraft]. Some of the Guard units may only be able to get to 21 PA. We are trying to fix the ones we have. I am not committing to well into the 2030s for the A-10. As I said, we will fly the A-10 to 2030.

Ms. MCSALLY. The Secretary said 2030. Okay. Sorry.

General HARRIS. Yes.

Ms. MCSALLY. So, well into, got it.

General HARRIS. Okay.

Ms. MCSALLY. 2032 is in the testimony, but okay.

General HARRIS. And we continue to have a discussion and a study to look at we are not walking away from the CAS [close air support] mission so we will continue to keep it minimum of 55. We are trying to grow to 70 fighter squadrons and we are looking at our ramp to get there, and as we bring in light attack that can actually help relieve some of the requirements on the fourth-gen [generation] platforms that we are seeing right now.

The A-10 only does about 20 percent of our CAS missions. It continues to be a great airplane and we will fly it while it fits into our program. But it doesn't support the National Defense Strategy of our high-end fight for Russia and China, and we continue to make those choices and those discussions for our future modernization.

Ms. MCSALLY. Right. And I very much support obviously the National Defense Strategy, but as long as we have Americans on the ground in harm's way, in certain circumstances we need the best capability overhead to get them home alive to their families and we know that this is a unique one that does that. So, thanks. I am out of time.

Mr. TURNER. We are going to have a number of provisions that—our informational provisions concerning the A-10 and one of the ones is going to go directly obviously to what Ms. McSally said, and that is since the production line was shut down while Congress was deciding whether or not the A-10 was going to be preserved, someone made a decision that cost the American taxpayer an enormous amount of resources, and we are going to be requiring an assessment of what that was. So, as we deal with these issues in the future hopefully at DOD someone will understand that until Congress takes action they ought not take action that affects the American taxpayer until the debate has been completed.

I would like that assessment because I would like that figure to be known so that people know that that contrary action really does affect the taxpayer.

With that we are going to Mr. Brown.

Mr. BROWN. Thank you, Mr. Chairman.

I think my question is for the Navy and Marines. I recently had the opportunity to visit the Naval Air Station Oceana, a great facility, and I am really excited about what the men and women there are doing. I met with the commander of the Strike Fighter Wing Atlantic and had an opportunity to tour the hangar and the other spaces that are used by the Strike Fighter Squadron 106.

We talked about the Hornet, the Super Hornet, and I see that in the budget request for the fiscal 2019 we are looking for—the request is for additional F-18s as we wait for more F-35s to come online.

One of the issues that came up during my conversation and my observations at Oceana is that the supply shortages and if we are looking to extend and increase the use and demand on the F-18, then the question is where are we, what is your assessment about the supply chain.

For those F-18s that are non-mission capable, are we attributing more to supply versus maintenance. Understand there is, you know, continues to be cannibalization that is happening. When I was an Army Aviation pilot, I don't know what the official policy was, but we never cannibalized, but I get that you have got to do that. It is not good for keeping aircraft up, it is not good for morale, for maintenance personnel, but if you could just talk to supply and cannibalization, particularly as it pertains to the F-18. Thank you.

Admiral GROSKLAGS. Sure, I will start. And then perhaps Admiral Conn will jump in with something that I may have missed.

Not mission capable for supply is our number one driver for readiness on the F-18, particularly the E and F. You are well aware that we have underfunded those accounts over the last 7 or 8 years. The average over the last 8 years were funded to about 72 percent of the requirement across the 8 years, so you can see how over time that would build up a very significant deficit in our spare support for that platform.



Starting with the RAA [request for additional appropriations] in FY 2017 and continuing into fiscal year 2018 and now into our PB19 budget request, funding for all of our aircraft, not just E and F spares has been increased dramatically into the 90, 95, almost 100 percent range across each of those fiscal years. That will take a little bit of time to have some effect as we have to go to industry, put those on contract, and get them delivered. But that is our primary effort at going after the spares shortage.

As you said, there is far too much cannibalization going on, but you can't really blame the squadrons at this point because that's what they are using to get their other jets up, so it is incumbent upon the rest of us to give them the resources they need in order to get those aircraft back on the flight line and the additional supply money will be a big part of that.

Admiral CONN. The only thing I would add is it is not just about the APN [Aircraft Procurement, Navy] 6, the new parts, it is making sure we can repair the parts we already bought. And with the investments we have in our APN 7 accounts to make sure our FRCs [Fleet Readiness Centers] have the right tools, the right benches to be able to turn around those parts is just as critical. That those FRCs have that equipment and the tools to turn around the parts we already bought, because quite frankly those parts are cheaper than the new ones and I think it is about 30 percent of the parts that we need in the fleet.

The cannibalization rate, you are exactly right, not only is it a bad way to do business, it takes twice the time, because you got to take the part out and you got to put the part back in and the sailors are doing twice the work for one job and there is a risk when you cannibalize that you break the part, as I think that you are well aware, sir.

So, this is an all-in strategy. You know, the investments we made in parts in 2017 will reach in full in 2019. There are investments we made in 2018 will realize that full effect in 2020, and then 2019 will be in full effect in 2021. There are other things we have to do before those parts show up and supply chain management is one of those, making sure that we got the right parts to the right aircraft to get them in the air, and part of that is tied to the Vision 2020 that Admiral Grosklags mentioned in his opening comment about supply chain management, predictive maintenance, and use of data analytics to make those good choices throughout the process.

Mr. BROWN. Thanks. And just for the 30 seconds I have I will get parochial. At Pax River Naval Air Station, do a lot of research, development, testing, et cetera.

We have got an aircraft prototype facility. They are waiting for funding, Phase 3 funding. It is on the DOD's unfunded priority list, but not the Navy's unfunded priority list. So, I would just like you to take a look at that and we will certainly follow up with you on that.

Thank you, Mr. Chairman, I yield back.

Mr. TURNER. Mr. Gaetz.

Mr. GAETZ. Thank you, Mr. Chairman.

Admiral Conn, you made mention of the tragic event where we lost some brave aviators down in Key West. I had occasion to meet

with the outstanding command staff that we have got down there and they took occasion while I was there to stress the importance of maintaining the Military Mission Line, so that the Navy could continue their operations in the eastern Gulf of Mexico free of the congestion that the erosion of that line or the movement of that line could create.

The Air Force has stated under the signature of General Goldfein that unequivocally the Air Force opposes any change to the Military Mission Line. Does the Navy hold a similar view?

Admiral CONN. I apologize, for the mission line for—

Mr. GAETZ. The Military Mission Line that preserves the eastern Gulf of Mexico for training, test and evaluation missions that benefit both the Air Force and the Navy. If it is something that you would like to get back to me on that's fine.

Admiral CONN. Let me get back to you on that, sir, and make sure that I fully understand the problem—

Mr. GAETZ. Yes, my question is do you have a different view of the Air Force since the Air Force has been unequivocal on this. Have I mischaracterized the Air Force's position, General Harris?

General HARRIS. No, we—unequivocal, we need to protect those range assets.

Admiral CONN. I would agree with that.

Mr. GAETZ. Wonderful. Thank you.

General Bunch, when we first met I was a country lawyer running around Okaloosa County, Florida, and you were doing great work at Eglin Air Force Base guiding our community through an EIS [environmental impact statement] process where we were anticipating a certain number of Air Force variant F-35s along with variants for the Navy and the Marines. The Navy and Marines have made other plans. They are going elsewhere.

In our current EIS caps, the universe of Air Force variants that we can have of the F-35 and we have these unfilled slots for the other branches of our services.

Does the Air Force believe that refreshing that EIS to reflect the need for more Air Force aircraft at Eglin could help us save money, could be advantageous, or do we live under the current EIS forever?

General HARRIS. Sir, if you don't mind I will speak to that from a plan perspective.

Mr. GAETZ. Certainly.

General HARRIS. We are looking at that. As the F-35 community grows, our ability to get trained aircrew pilots in this case through, we are looking at both the airplanes that are possessed there which are some of the oldest in the fleet, looking at how we can modernize and refresh those along with looking at the EIS because it is limited to 59 total F-35s and we recognize that, that there is some room to work. So, we will take that through our strategic basing process and make sure that we get a good look at it.

Mr. GAETZ. So, it is a goal then of the Air Force to have more of the F-35 A variant allowed under that 59 cap?

General HARRIS. I can't say it is a goal. It is something that we are studying.

Mr. GAETZ. Great, and is there a timeline for that decision calculus?

General HARRIS. Not yet, no, sir. We are looking at it. We still have room to grow at Luke, but as Luke fills out looking at Eglin to make sure we have got the decisions made in time if that is where we are going. That would have to be a couple of years before Luke completes its build.

Mr. GAETZ. I would simply offer to you that when General Bunch and I went through that process previously there were factors and circumstances that I think no longer would present a challenge to allow us to be able to fully utilize that Air Force asset to fulfill the mission.

Admiral Grosklags, I wanted to ask you about plans on the TH-57. The TH-57 fleet right now is old. The chairman I believe talked about training aircraft and what our plans were, is there a replacement strategy for the TH-57?

Admiral GROSKLAGS. There is. I think Admiral Conn can probably address this better than I can.

Mr. GAETZ. Wonderful.

Admiral CONN. Our strategy for replacing the TH-57 is to go commercial off-the-shelf. We are going to buy a commercial aircraft and integrate it into the training down in Florida. That timeline will probably start in 2020 and we will start buying aircraft in 2020 and be divested by the TH-57 by approximately 2023. So we don't have to do any testing on the aircraft. So, it is a buy and start flying.

Mr. GAETZ. I greatly appreciate that sense of urgency. I know at Whiting we have got over 200 circumstances a year where a helicopter that takes off at the base has to come back on a truck for that purpose. Have we contemplated a strategy that would be turnkey training or have we dismissed that as an alternative?

Admiral CONN. We have not. All options are on the table.

Mr. GAETZ. And what are you evaluating or what can you share with me about where the Navy's thinking is on the benefits and drawbacks of turnkey training versus a procured and purchased commercial system?

Admiral CONN. I think the fact that we are getting ready to compete this, both the aircraft and then potential turnkey solutions, I am hesitant to address the strengths and weaknesses at this point.

Mr. GAETZ. That is fine. I just want to make sure that as the RFP [request for proposal] goes out that it is sufficiently permissive where if someone has a turn—and I am not a partisan for turnkey versus a procured commercial system. I simply want to make sure that the Navy has both of those options to compare and it sounds as though that is your plan.

Admiral CONN. That is correct.

Mr. GAETZ. Thank you, Mr. Chairman. I yield back.

Mr. TURNER. Mr. Graves.

Mr. GRAVES. Thank you, Mr. Chairman.

I thank you all for being here today. My question is for Admiral Grosklags.

The Navy's physiological events team obviously led by Admiral Joyner has been keeping us well up-to-date as a matter of fact on the progress with PE issues that her organization continues to look at. And, you know, they take a holistic approach to examining those problems and obviously the solutions.

My question to you is, can you speak for just a minute on the difficulties that the Navy could encounter if Congress attempts to legislate some specific mechanical solution rather than just letting the Navy continue to maintain its approach and flexibility as you learn and test new things?

Admiral GROSKLAGS. Yes, sir. As you know, we are taking a very holistic approach. And that was I will say reemphasized if you will to us by the NASA study last year, where they looked at what we were doing and said you are actually focusing too much on just mechanical solutions and you really need to get the aviator, the physiology, the operational environment into your considerations more than just fixing the eatches on the aircraft.

We fully recognize we need to continue to fix each one of those mechanical things if you will that we have identified to date, and that Congresswoman Tsongas mentioned many of those in her opening remarks and her follow-on question. But there are other things that have been put on the table for several years now, mechanical fixes that in the end as we have examined them have panned out to not be as valuable as originally thought. So, the real focus that we have right now is on getting to the root cause of things and changing only those things that we have demonstrated by fact that impact the rate of physiological events.

A very simple recent example, actually I can give you two of them very quickly. The software fix that Congresswoman Tsongas referenced, we introduced that to the fleet about 2 months ago. We had a PE on an aircraft about 3 weeks ago I believe. That aircraft did not yet have that software fix installed. If it would have, it would have prevented that PE.

There is a ram air dump switch that was inadvertently activated during one of our physiological events. When we looked at that mishap we said, well, or that physiological event, we said we are probably not going to change that dump switch location because of one PE. But when we looked at it further, when we pulled the string through that root cause corrective action process, it turned out that the pilots were hitting that dump switch many more times that weren't causing physiological events, but had the potential to.

So, now we are going to go in and make a fix to the location of that switch to address that specific problem. Those are the kind of eatches that we have to get at while we are doing this along with, again, the aircrew physiology stuff that NASA recommended.

Mr. GRAVES. I appreciate your answer. My worry is always when Congress gets involved and tries to legislate specific fixes all it does is end up creating problems, costing money, and it is very counter-productive. So, thank you for your answer.

Thanks, Mr. Chairman.

Mr. TURNER. Mr. Langevin.

Mr. LANGEVIN. Thank you, Mr. Chairman.

And I want to thank our panel of witnesses. Thank you all for your testimony and for your service to the country.

It is important with all budget requests that we really strike the appropriate balance between building and procuring new next-generation systems and modernizing systems that still have plenty of life in them. My question is, how are you thinking about including game-changing capabilities such as directed energy weapon sys-

tems which are low-cost, high-range, deep magazine capable technologies, both from the outset in the requirements building phase, as well as through the modernization processes?

General HARRIS. Congressman, if you don't mind, I will start with that down here from an airman's perspective. Because of the budget increases and what we are looking at are some of the gaps in some of the areas that we are not sure of if we can get further ahead than we currently are, we are making some healthy bets in some of those areas.

The ones you mentioned in addition to advanced computing, big data, artificial intelligence, robotonomy and autonomy—I am sorry, robotics and autonomy. We are looking at each one of those and coming together as a group of services through CAPE [Office of Cost Assessment and Program Evaluation] to see how we can best pool our capabilities, so that when one of us makes an advance, it applies and helps all of us as we move forward, because each one of the services has a budget line to support those efforts and we are figuring out what is our best way, because just going at things the same way of modernizing old stuff, it is still going to be old stuff, just going to last longer, but it may not be as effective as you would like it to be.

So, we are working in that direction to make sure that we do have game-changing technology headed our way.

Mr. LANGEVIN. Thank you, General.

Anyone else want to chime in?

Admiral GROSCKLAGS. I will touch on two things. I will stick with directed energy first. We are not pursuing anything that we can talk about here right now on aviation platforms, but we do plan to have a directed energy capability on one of our surface ships that we will have back out there in fiscal year or in calendar year 2019. So, the Navy is pursuing directed energy. But right now, it is more focused on our sea-based than our aviation platforms.

The other place that I think, as General Harris said, we are collectively making significant investment right now is in hypersonics, not only in the defensive side, but also just as importantly, perhaps more importantly, on the offensive side of the house. And as he said, this is really about the services coordinating as opposed to going down an individual service path. And I think our service acquisition executives and our service secretaries have kept us very focused on that joint effort, joint pursuit of these new technologies.

Mr. LANGEVIN. Thank you.

General RUDDER. I will just offer for the directed energy thing for this discussion, one of the things you are going to see very quickly is the counter-UAS [unmanned aerial system] piece. So, we are working through that right now. That seems to be proving very valuable as far as that going against those type of systems.

I will also mention something a little more simple and that is taking all the information that is being derived from the F-35 series of aircraft and what do you do with that information. There are several different efforts out there right now to take a broadly how to take all the waveforms and condense them into the ability to get it down to the corporal on the ground.

And we are doing some experimentation right now out at our weapons tactics squadron with tablets and using the ability to use

tablets out on the battlefield. So, the goal would be if you look into the future is that corporal, that squad leader that is going into the objective area, on his tablet, he has got the same information that the F-35 is seeing or any unmanned system in the area is providing to him.

Mr. LANGEVIN. Very good. Thank you, General.

So, I am interested, greatly interested in the pilot shortage as well, particularly combat pilots which is most acute I know right now in the Air Force. Though, if time permits, I would like responses from each of the services. My understanding right now reaffirmed by a GAO [Government Accountability Office] report released yesterday is that pilots are leaving for the civilian sector not because of pay or promotions or op tempo in the service, but primarily due to career dissatisfaction from the lack of flying when not deployed.

So, I am sure you have your own analysis as to why good combat pilots are leaving, but what do we need to do to keep them?

Admiral CONN. I will go first. One, we are in a war for talent for our folks that fly our aircraft. They are going to the airlines. They are going to med [medical] school. They are going to law school. They are going to get their MBA [Master of Business Administration] and they are starting their own businesses.

My focus is on reducing distractions and one of those distractions is not flying enough particularly in our maintenance and basic phase where we are struggling with our readiness. We are paying, we are putting the folks forward with the proper readiness training and certification, but it is at the expense of folks on the bench. And that is what we have to fix through our readiness accounts. The GAO report, the only thing that I will say from the Navy perspective in the shortfalls they addressed, it is not from a retention shortfall. It is from our T-45 challenge of shutting down T-45 operations, taking a pause and that is causing a shortfall in the fleet.

Today, it is about 70 pilots short for 58 squadrons. Yes, that will increase to about 160 short in FY 2019 for those 58 squadrons, but we are going to work our way through that T-45 pause through manning actions, increasing tour lengths, and as well as taking risk in manning levels for those squadrons in the maintenance and basic phase.

General HARRIS. And, Congressman, if you don't mind, I will add to that. I would second what the admiral has said about why the pilots are leaving. Ours are very similar from an airman's perspective and this is a very talented pool of people who if we give them the right circumstances will stay longer and do what we need in our Nation's defense. So, we are working that.

To help, the Air Force has stood up an aircrew crisis task force that is looking at each one of these topics. It is partly on retention, partly focused on bringing in new pilots in a bigger quantity because this is a national crisis. You are seeing it first in your services, but you are going to see it very soon in your airlines where there are just not enough pilots to go around as the airlines are hiring 5,000 pilots a year and us at the table are only producing 2,000 a year. There's going to be an issue.

So, you will see it first in your regional then moving up to your bigger aircraft, just the availability of pilots writ large. So, we will

solve a portion of that and try and keep those pilots under a highly demanded skill set in our services longer across all three of us.

Mr. LANGEVIN. Is there a plan to finally distribute the findings of the task force? What is going to be the result of that?

General HARRIS. Yes, sir. But, it is not just an Air Force piece. So, we are doing this with the services that you see at the table. But we are also working with our commercial industry to figure out how can we solve this together as a national problem. So, as we get to completion and we look to funding what we can to solve some of these issues, if it is a funding issue or freeing up white space, or getting more aircrew available so that they can focus their time on the flying rather than doing additional duties that don't necessarily improve their combat capability, we will certainly share that information.

Mr. LANGEVIN. Thank you, General.

Thank you, all. I yield back.

Mr. TURNER. Turn to Ms. Tsongas, for closing comments?

Ms. TSONGAS. I just want to thank you all for your testimony and for your service.

And, Admiral Grosklags, I wanted to specially commend the Navy for finally taking a look at the human physiology, the human being who is the aircraft crew as you are addressing the issue of physiological events. I am grateful the NASA report focused on that and that you have taken it seriously. So, thank you all for your service and for being here today.

Mr. TURNER. And with that, we will be adjourned.

[Whereupon, at 3:19 p.m., the subcommittee was adjourned.]





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# **A P P E N D I X**

APRIL 12, 2018

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**PREPARED STATEMENTS SUBMITTED FOR THE RECORD**

APRIL 12, 2018

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**Statement of the Honorable Michael Turner  
Chairman, Subcommittee on Tactical Air and Land Forces  
Navy, Marine Corps and Air Force Combat Aviation Programs  
April 12, 2018**

The hearing will come to order.

The subcommittee meets today to review Air Force, Navy and Marine Corps combat aviation programs and the fiscal year 2019 budget request.

I would like to welcome our distinguished panel of witnesses:

- Vice Admiral Paul Grosklags, Commander of the Naval Air Systems Command;
- Lieutenant General Steven Rudder, Deputy Commandant of the Marine Corps for Aviation;
- Rear Admiral Scott Conn, Director of the Navy's Air Warfare Division;
- Lieutenant General Arnold Bunch, Military Deputy in the Office of the Assistant Secretary of the Air Force for Acquisition; and
- Lieutenant General Jerry Harris, Air Force Deputy Chief of Staff for Plans, Programs, and Requirements.

I thank all of you for your service and look forward to your testimony today.

This hearing continues the subcommittee's ongoing oversight of combat aviation modernization and represents the third hearing the subcommittee has held this year alone on this topic.

Last year when the Subcommittee held this hearing on the fiscal year 2018 budget request, we heard how years of continuous combat operations and deferred modernization had created a crisis in military readiness.

The bipartisan budget agreement signed by the President in February and the Fiscal Year 2018 Consolidated Appropriations Act will help provide much needed stability and relief. Combined with the fiscal year 2019 budget request, the military services should be able to begin digging out of this hole.

Our witnesses today have been asked to identify their top five modernization requirements for the combat aviation portfolio and briefly summarize how this budget request helps to restore full spectrum readiness.

We also expect the witnesses to articulate how these requirements are aligned with the goals and objectives of the new National Defense Strategy.

We expect to examine a broad range of issues today that I'll highlight later in this statement, but first I want to address some issues brought to my attention by F-35 pilots and maintainers at Hill Air Force Base when I traveled there last week.

The pilots were very concerned about their visual acuity during night refueling operations using the F-35 pilot helmet, describing the situation as a safety issue.

The pilots also stated that Navy pilots conducting night aircraft carrier landings in the F-35C and Marine Corps F-35B conducting night landings on amphibious ships have a similar safety concern.

The maintenance personnel are still very disappointed in the autonomic logistics information system, or ALIS. They continue to have to use manual workarounds that take time and effort, resulting in lower aircraft availability and mission capable rates.

I'd like for each of the witnesses to address these concerns and strongly urge each of you to work with the F-35 program office to get these items fixed.

I'll just briefly touch on a few other key areas that we expect to cover this afternoon.

Regarding F-35A production. The subcommittee would like to better understand the rationale for this year's F-35A request which amounts to 48 aircraft and why there is no real significant increase given last year's unfunded requirement for 14 additional aircraft. General Harris, you testified before this Subcommittee last year and stated that "the Air Force needs to increase F-35A procurement to a minimum of 60 aircraft per year as quickly as possible." I would also note that three years ago, the Air Force planned to procure 60 F-35As in fiscal year 2019.

Regarding Physiological Episodes. We continue to be concerned by the increased rates of physiological episodes occurring in Navy and Air Force aircraft. We recognize the work that is being done to mitigate these events but remain concerned about the overall progress made in determining a root cause. This is a good opportunity for the witnesses to provide some detail into how this budget request supports mitigation efforts.

Regarding Aviation Readiness and Strike Fighter Inventories. It's my understanding the Navy continues to absorb risk in its management of the strike fighter inventory. I understand the Navy has submitted a request for F/A-18 multiyear procurement authorization, which if authorized, should make the procurement of Super Hornets more efficient and less costly.

Last year the Navy and Marine Corps continued to fall short the number of ready basic aircraft. We'll look to better understand what efforts are currently underway to mitigate potential strike fighter shortfalls and improve readiness.

Regarding Training aircraft. The Subcommittee continues to have concerns regarding the overall age of the training aircraft fleet. I believe if we're fielding 5th generation aircraft then we should be fielding a 5th generation trainer. I look forward to hearing an update on the Air Force's next generation trainer, the T-X program.

Regarding munitions. While I'm pleased to see many critical munition programs are being kept at maximum production in the budget request, I am concerned that years of under-investment has created shortfalls in munition inventories that are being exacerbated by current operations. We need to better understand the challenges you currently face with managing munition programs as well as this critical industrial base.

Finally, let there be no doubt that we are experiencing a crisis in military readiness and we must address this now.

More U.S. military service members have died in aircraft mishaps over the past year than have died while serving in Afghanistan.

Over the last three and a half weeks we have witnessed a series of aviation accidents where 16 service-members have tragically lost their lives. One of those service-members was a constituent of mine. Gunnery Sergeant Derik Holley was a 33-year old enlisted Marine and he was killed while conducting training missions in a CH-53E helicopter, a helicopter that has been in service since the 1970s.

These tragic events are a result of lack of training hours due to constrained resources and/or the current state of aging equipment; all of which resulted from years of underfunding our military, and clearly shows the magnitude of the problem we are dealing with. This is why we have fought so hard to raise the Department's topline budget request.

We have to do whatever it takes to ensure that our aircraft are safe and that pilots get the training they need.

Without objection, all witness' prepared statements will be included in the hearing record.

Admiral Grosklags please proceed, followed by General Rudder, Admiral Conn, General Bunch and General Harris.

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THE HOUSE ARMED SERVICES COMMITTEE  
TACTICAL AIR AND LAND FORCES  
SUBCOMMITTEE

STATEMENT OF

VICE ADMIRAL PAUL GROSKLAGS  
REPRESENTING THE ASSISTANT SECRETARY OF THE NAVY  
(RESEARCH, DEVELOPMENT AND ACQUISITION)

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'S AVIATION PROGRAMS

APRIL 12, 2018

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



**INTRODUCTION**

Mr. Chairman, Ranking Member Tsongas and distinguished members of the Subcommittee, we thank you for the opportunity to appear before you today to discuss the Department of the Navy's (DoN) Fiscal Year (FY) 2019 aviation programs. Our budget request aligns to the current National Defense Strategy which identifies a more complex global security environment characterized by overt challenges to the current international order and the resurgence of long-term, strategic competition between nations. This request recognizes that we are emerging from a period of strategic atrophy that has resulted in the erosion of some of our competitive military advantage.

DoN aviation remains highly capable today and we are prepared to respond as the nation requires. The Navy-Marine Corps team provides a maritime strike and expeditionary power projection force that is continuously forward-deployed. We provide the persistent presence and multi-mission capabilities that represent a majority of U.S. influence across the global commons. To protect our Nation and support our allies and partners, Naval Aviation programs require your continued support. As we prioritize our preparedness, we request your assistance to improve the resilience of our current force posture, modernize key capabilities, and accelerate technological advancements to address new adversary challenges in every domain.

Our FY 2019 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 ask you to help us expand on the assimilation and teaming of manned and unmanned systems and the further integration of advanced platforms, sensors, networks, the electromagnetic spectrum and long-range strike weapons that provide the necessary military advantage over those challenging the global posture.

As part of our enduring commitment to fiscal responsibility and accelerating delivery of advanced capabilities to the warfighter, the Department continues its pursuits of accelerated acquisition and business process reforms.

We are maturing accelerated acquisition authorities Congress provided under the FY 2017 National Defense Authorization Act (Sections 803, 804 and 806). These new measures include implementation of accelerated acquisition policies for Rapid Prototyping, Experimentation and Demonstration, establishment of Maritime Accelerated Capability Office programs, and the use of Rapid Deployment Capability processes. As part of these efforts, we are actively promoting innovation, government/academia partnerships, and the transition of key manufacturing technologies and processes with investments focused on affordability and those most beneficial to the warfighter.

Our business reform measures include new focus on achieving full auditability of operations, improving financial control systems, and providing advanced tools to our workforce to better understand, manage and reduce cost. We intend to reform our business operations and leverage savings to improve readiness and increase the lethality and capacity of Naval Aviation.

The strategic environment continues to be complex, uncertain, and technologically advanced; the proliferation of modern conventional and cyber weapons from state and non-state actors is anticipated to propagate as rival states and organizations attempt to contest our influence. With the sustained support of Congress we can begin to restore our competitive naval advantage, enhance global deterrence, and ensure 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. The President's FY 2019 budget request puts us on track to reach

our desired force structure no later than FY 2022 (est.). The key enabler will be stable, on-time funding over multiple years to achieve the desired results.

The FY 2019 request addresses the strike fighter shortfall with procurement of 20 F-35Bs, nine F-35Cs, 24 FA-18E/F Block III Super Hornets and additional aircraft across the FYDP. In tandem with these procurements, Service Life Modification (SLM) 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.

Based on current requirements and inventory modeling, we will maintain a portion of the Navy and Marine Corps F/A-18 A-D aircraft to meet operational requirements through the FY 2030 timeframe. Navy will expedite its divestiture from the legacy Hornet – seven years ahead of schedule – with the last Navy active component squadron transitioning to the F/A-18E/F in 2018. As the Navy divests legacy F/A-18 A-D, the “best of breed” aircraft will be transferred to the Marine Corps, Naval Warfare Development Center, Blue Angels, and the Naval Reserves. The FY 2019 request will allow the DoN to completely divest from the legacy A-D Hornets no later than the FY 2030 timeframe.

#### **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 (CAS), counter air, escort, or electronic warfare (EW), 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. Delivering this transformational capability to 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 30 percent over current projections.

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

The FY 2019 President's budget requests \$4.2 billion in Aircraft Procurement funds (APN) for 20 F-35B and nine F-35C aircraft, modifications and spares.

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

As the F-35 program looks to close 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 is restructuring 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 2019 C2D2 ramp-up we request \$644.0 million in Research, Development, Test, and Evaluation funds (RDT&E).

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

Service Life Extension Plan (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 2019 budget requests \$273.2 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 \$67.0 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 mid-late 2030s. Continued investment in new aircraft and capability upgrades and flight hour extensions significantly improves CVW lethality.

The FY 2019 President's Budget requests \$1.99 billion in APN for procurement of 24 F/A-18E/F Super Hornet aircraft and \$301.4 million of RDT&E for Block III, Infrared Search & Track (IRST) development/test, F/A-18E/F SLM initiatives and RADAR upgrades.

#### **AV-8B Harrier**

The FY 2019 budget requests \$46.4 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 2019 budget also includes \$58.6 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 beginning in the mid-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, unmanned, and optionally manned 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 in 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 FY 2018, with a total procurement quantity of 160 aircraft. This fulfills current Navy requirements for Airborne Electronic Attack (AEA) for nine CVWs and five expeditionary squadrons plus one reserve squadron.

The FY 2019 President's Budget requests \$147.4 million of RDT&E for additional modernization to ensure the EA-18G maintains its edge in the electromagnetic spectrum domain.

**EA-6B Prowler**

The Marine Corps currently has one remaining operational EA-6B squadron to support joint AEA operational requirements through FY 2018. These organic AEA capabilities include the Intrepid Tiger II EW pod, which provides communications electronic attack and support for the Marine Air-Ground Task Force (MAGTF). The FY 2019 President's Budget request includes \$18.5 million in RDT&E and \$11.5 million in APN for Intrepid Tiger II updates and procurement.

**Next Generation Jammer (NGJ)**

The NGJ is the follow-on to the legacy AN/ALQ-99 initially fielded in 1971. The ALQ-99 has reached capability limits both technologically and materially and is challenged against modern state-of-the-art digital surface-to-air missiles systems. NGJ will provide improved capability in support of Joint and coalition air, land and sea tactical strike missions and is critical to Navy's vision for the future of strike warfare. It will become the Defense Department's only comprehensive tactical airborne electronic attack platform and is essential to counter current and emerging threats.

NGJ will be implemented in three increments: Mid-Band (formerly known as Increment 1), Low-Band (formerly known as Increment 2), and High-Band (formerly known as Increment 3). The April 2017 NGJ-Mid-Band Critical Design Review revealed deficiencies in the design of the pod structure that necessitated a redesign effort to meet air worthiness requirements. The information available to date about this redesign indicates a potential for a schedule impact of more than six months. A collaborative government/industry analysis effort to redesign the structure is expected to complete in April/May 2018. Once the redesign of the pod structure is complete, we will realize the full impact to the NGJ-Mid-Band program. Independent of the structural issue, the design, integration, manufacture, and testing of all other pod components, sub-assemblies (such as the arrays, power generation, cooling, common electronics unit), and software continue. Platform integration efforts remain aligned to the EA-18G H16 System

Software schedule; the next Generation Jammer Low Band program is investigating possible accelerated acquisition strategies to accelerate Initial Operating Capability (IOC).

Our FY 2019 budget requests \$459.5 million in RDT&E to maintain Mid-Band schedule, continue procurement and assembly of the Engineering and Development Models, and commence developmental flight testing. In addition, we also request \$115.3 million RDT&E to complete Low-Band technology feasibility studies and initiate technology demonstration efforts.

### **AIRBORNE EARLY WARNING AIRCRAFT**

#### **E-2D Advanced Hawkeye (AHE)**

The E-2D AHE is the Navy's carrier-based Airborne Early Warning and Battle Management Command and Control system. The E-2D AHE provides Theater Air and Missile Defense and is a cornerstone of the Naval Integrated Fire Control – Counter Air system of systems capability.

The FY 2019 President's Budget requests \$223.6 million in RDT&E for continuation of added capabilities, to include Aerial Refueling, Secret Internet Protocol Router chat, Advanced Mid-Term Interoperability Improvement Program, Counter Electronic Attack, Multifunctional Information Distribution System /Joint Tactical Radio System Tactical Targeting Network Technology, Sensor Netting, and Data Fusion, Navigation Warfare, Fighter to Fighter Backlink, ALQ-217 Electronic Support Measures, and Crypto Modernization/Frequency Remapping.

In the first year of what will be a 24 aircraft Multi-Year Procurement contract covering FYs 2019-2023, the budget also requests \$983.4 million in APN for four Full Rate Production (FRP) Lot 7 aircraft and Advance Procurement for FY 2020 FRP Lot 8 aircraft.



**ASSAULT SUPPORT AND LOGISTICS SUPPORT AIRCRAFT****MV-22B/CMV-22B**

The FY 2019 President's Budget requests \$143.1 million in RDT&E for continued product improvements and development of the Navy variant, the CMV-22B; \$843.2 million in APN for seven Lot 23 CMV-22Bs, procurement of long lead items for FY 2020 (Lot 24) aircraft; and \$214.8 million to support 'Operations and Safety Improvement Programs' (OSIPs). Planned OSIP efforts include the correction of deficiencies, readiness improvements, common configuration modernization, aerial refueling, and avionics improvements.

**C-2 Greyhound**

As the DoN recapitalizes the long-range aerial logistics support and Carrier Onboard Delivery (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 2019 budget request provides for \$11.32 million in APN and \$0.8 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 2019 President's Budget requests \$326.9 million in RDT&E to continue the CH-53K Engineering Manufacturing Development phase and \$1.3 billion in APN for procurement of eight Lot 3 LRIP aircraft, including Advance Procurement and initial spares.

During FY 2019, the program will continue to execute developmental test flights including propulsion testing, initial shipboard testing, avionics qualification testing, service ceiling testing, and hot/high altitude testing.

**CH/MH-53E**

To keep the CH-53E and MH-53E viable through their remaining services lives, the FY 2019 President's Budget requests \$52.0 million in APN and \$17.0 million 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, satellite communications kits, 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. The unprecedented operational demand of the CH-53E degraded the material condition of the heavy lift assault support aircraft sooner than expected; therefore, modernization to the CH-53K King Stallion is vital. 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 Littoral Combat Ship (LCS).

**ATTACK AND UTILITY AIRCRAFT****AH-1Z/UH-1Y**

The FY 2019 President's Budget requests \$907.9 million in APN for 25 AH-1Z aircraft and system improvements and \$58.1 million in RDT&E for continued product improvements/upgrades.

The H-1 upgrades program integrates a DI environment established throughout the MAGTF. H-1 DI and Full Motion Video efforts have expanded this capability for both the Venom and the Viper. With the integration of Intrepid Tiger II, the Marine Corps' Light Attack Helicopter Squadron community provides MAGTF Commanders multi-domain maneuverability.

**MH-60R/S**

The FY 2019 President's Budget requests \$130.7 million in APN and \$23.4 million in RDT&E. APN funds support safety related systems improvements, correction of deficiencies, warfighter upgrades, and obsolescence issues such as Mission Computer modernization and procurement of kits for the Helmet Display Targeting System and Advanced Data Transfer System. RDT&E,N is requested to support development efforts that include MH-60S Service Life Assessment Program, software integration of the Advanced Off-board Electronic Warfare pod, and implementation of Link-16 J11 and J12.6 series messages that will enabling the helicopter to provide in-flight target updates to Net Enabled Weapons.

**EXECUTIVE SUPPORT AIRCRAFT****VH-3D/VH-60N Executive Helicopter Series**

The FY 2019 President's Budget requests \$23.6 million of APN to continue programs that ensure the in-service Presidential fleet remains safe and reliable. 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 2019 President's Budget requests \$245.1 million in RDT&E to continue Engineering Development Model (EDM) activities, to include, contractor test for airworthiness certification and modifications of EDM and System Demonstration Test

Article aircraft. Additionally, \$649.0 million of APN is requested to procure six LRIP Lot 1 aircraft and associated support.

#### **FIXED-WING AIRCRAFT**

##### **KC-130J (USMC)**

The FY 2019 President's Budget requests \$270.4 million to procure two KC-130Js and spares as part of a proposed multi-year procurement (MYP III) and \$78.1 million in APN for targeted improvements. Key improvements include increased survivability through advanced electronic countermeasure modernization 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, CAS and Multi-sensor Imagery Reconnaissance capabilities in support of Special Purpose MAGTFs and deployed Marine Expeditionary Units.

##### **KC-130J (Navy)**

New in the FY 2019 President's Budget, Navy has started a recapitalization effort for its legacy C/KC-130T aircraft. This initiative creates a uniform DoN procurement of KC-130J model aircraft. To support the plan, we request \$12.0 million in FY 2019 APN (Advance Procurement) to pay for up-front costs needed to support the multi-service KC-130J MYP III. This effort begins the recapitalization of a 25 aircraft program of record.

#### **MARITIME SUPPORT AIRCRAFT**

##### **P-8A Poseidon**

The P-8A Poseidon recapitalizes the wide area Anti-Submarine Warfare (ASW), Anti-Surface Warfare (ASuW) and armed ISR capabilities of the aging P-3C Orion. The P-8A combines the proven reliability of the commercial 737 airframe with modern

avionics that enables the integration of modern sensors and robust military communications.

In FY 2019, we request \$1.98 billion in APN for ten aircraft and \$197.7 million in RDT&E for aircraft updates to include the addition of Networked Enabled Weapons capabilities, satellite communications, track management and sensor fusion capability.

#### **P-3C Orion**

The aging P-3C fleet will continue to provide critical ASW, ASuW and ISR support for operations worldwide until the fleet completes transition to P-8A. The FY 2019 budget request includes \$0.8 million to manage P-3C aircraft mission systems obsolescence and \$2.13 million to fund the P-3 Fatigue Life Management Program to maintain sufficient airframe safety margins and capacity to complete transition to P-8A.

#### **EP-3 Aries**

The EP-3E Aries is currently Navy's only 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 P-3 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 EP-3E airframe and associated mission systems to minimize SIGINT capability gaps until the systems are fully recapitalized with 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 \$9.0 million for the EP-3 program as we transition Navy's maritime ISR.

**C-40A**

The C-40A is a military variant of the Boeing 737-700C, a combination passenger/cargo aircraft, with military avionics and aircraft survivability equipment. In FY 2019, we request \$206 million in APN to procure two C-40As for the Marine Corps.

**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 we integrate this technology within our total force.

**MQ-4C Triton UAS**

The FY 2019 President's Budget requests \$14.4 million in RDT&E to continue Triton baseline development activities; \$219.9 million in RDT&E for Multi-INT modernization; and \$719.4 million of APN for procurement of the fourth lot of LRIP aircraft and spares, retrofit of the LRIP Lot 1 aircraft to the Multi-INT configuration, and procurement of long-lead materials for the fifth lot of LRIP aircraft.

**MQ-25 Stingray**

MQ-25 will deliver the Navy's first carrier-based UAS to function primarily as a mission tanker to extend the range, reach, and lethality of the CVW, with secondary recovery tanking and ISR capabilities. MQ-25 will reduce current use of F/A-18E/Fs as CVW tankers, freeing F/A-18E/Fs to execute strike fighter missions, effectively increasing strike fighter capacity within the CVW. The FY 2019 President's Budget requests \$718.9 million in RDT&E for MQ-25 development activities.

### **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 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 designed to operate from any suitably-equipped air-capable ship, carry modular mission payloads, and operate using the Tactical Control System (TCS) and Line-Of-Sight Tactical Common Data Link.

In FY 2019, we request \$9.8 million of RDT&E to continue hardware and software modifications, payload integration, cyber vulnerability closure and safety capability improvements and \$92.7 million in APN to procure four MQ-8 mission control systems and three MQ-8C Active Electronically Scanned Array radar kits. Included in the procurement request is support for ancillary shipboard equipment, trainers/aircraft support equipment, technical support, and the logistics to outfit suitably-equipped air-capable ships and train the associated Aviation Detachments.

### **Tactical Control System (TCS)**

The FY 2019 President's Budget requests \$8.5 million in RDT&E for the MQ-8 System's TCS. TCS provides a standards-compliant open architecture with scalable command and control capabilities for the MQ-8 Fire Scout system. In FY 2019, we will continue the transition of the Linux operating system to a technology refreshed mission control system, enhance the MQ-8 System's Automatic Identification System and sensor track generation integration with ship systems, overcome hardware obsolescence issues with the Solaris based control stations, provide lower cost software updates using DoD common application software, and enhance collaboration with the Navy's future UAS Common Control System.

**RQ-21A Blackjack**

The FY 2019 President's Budget requests \$16.3 million in RDT&E (\$5.4 million USN, \$10.9 million USMC) and \$21.8 million in APN for support of Marine Corps and Naval Special Warfare forces to address ISR capability requirements.

**MAGTF Expeditionary UAS (MUX)**

As the Marine Corps recapitalizes toward a more diverse, lethal, amphibious and middleweight expeditionary force, Marines require a UAS that is network-enabled, digitally interoperable, and built to execute responsive, persistent, lethal, and adaptive full-spectrum operations. MUX is planned to be the system that will provide the MEF/MEB-sized MAGTF with an advanced multi-mission platform.

The FY 2019 budget requests \$20.4 million in RDT&E for the MUX program to conduct an AoA and begin development of an acquisition strategy; \$4.9 million in RDT&E for KMAX operations (i.e. CQ-24A Cargo UAS Experimentation and Support Services) in support of MUX technology demonstrations and Concept of Operation development (included under the MUX line).

**Common Control System (CCS)**

The FY 2019 President's Budget requests \$49 million in RDT&E and Other Procurement Navy (OPN) for continuation of Common Control System (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 uses an open and modular architecture and will integrate with MQ-8B/C in FY 2019 with future integration of MQ-4 and Large



Displacement Unmanned Undersea Vehicle. CCS VM (Increment 1) was delivered to the MQ-25 program office in FY 2017 and planned updates are being accelerated to maintain alignment with the MQ-25 schedule. In FY 2019, CCS/Increment 1 will conduct VM integration and test in both MQ-25 and MQ-8. Concurrently, CCS, Increment II will continue to develop MM/MP capabilities to meet platform operational requirements with the first release planned for mid-2020.

### **STRIKE WEAPONS PROGRAMS**

#### **Cruise Missile Strategy**

The Department's Cruise Missile Strategy (CMS) provides for the development of stand-off attack capabilities from air, surface, and undersea platforms against both Surface and Land Domain targets. The key CMS tenets are:

1. Maintain and upgrade legacy cruise missiles.
2. Pursue advanced near/mid-term capabilities.
3. Plan and develop next generation integrated solutions.

#### **Tactical Tomahawk (TACTOM) Block IV Cruise Missile**

The FY 2019 President's Budget requests \$282.4 million in RDT&E, \$98.6 million in Weapons Procurement Navy (WPN) and \$92.9 million in OPN.

RDT&E will be used for development/test of navigation and communications upgrades to improve TACTOMs performance in Anti-Access/Area Denial environments (A2/AD), development/test of Maritime Strike Tomahawk (MST), development/test of a Global Positioning System M-Code capability, development/test of the Joint Multiple Effects Warhead System and Fuse, and 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 transition from a missile production to a missile recertification phase, production line shutdown, procurement of 112 A2/AD kits and completion of 87 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.

**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 high-value surface combatants protected by Integrated Air Defense Systems with long-range Surface-to-Air-Missiles and deny adversaries sanctuary of maneuver against 2018-2020 threats. The program is scheduled to achieve Early Operational Capability on the Air Force B-1B by the end of FY 2018 and Navy F/A-18E/F by the end of FY 2019.

The FY 2019 President's Budget request \$143.1 million in RDT&E for LRASM development and testing and \$81.2 million in WPN to purchase 25 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 Next Generation Land Attack Weapon (NGLAW) AoA results to inform the required ASuW capabilities. Due to Increment 2 budget marks, Navy requests support for an incremental upgrade 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.

#### **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. NGLAW initially complements, and then eventually replaces the Tomahawk Weapon System. IOC is planned for the 2028-2030 timeframe (est.). The FY 2019 budget requests \$16.9 million to begin the transition of NGLAW to a program of record.

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

The FY 2019 President's Budget requests \$40.1 million in RDT&E and \$78.3 million in WPN. RDT&E will be applied toward the Engineering Manufacturing Development of critical hardware redesign driven by obsolescence; developmental test of System Improvement Program missile software (Version 9.4); and design and development of Insensitive Munition (IM) improvements (Joint Chiefs of Staff IM mandate).

WPN funding is requested to procure a combined 192 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 2019 President's Budget requests \$32.5 million in RDT&E for continued software capability enhancements and \$212.2 million in WPN for 141 All-Up-Rounds and associated missile/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 2019 President's Budget requests \$104.4 million in RDT&E for continued development/test of the SDB II weapon, the BRU-55 bomb rack modification (required for IOC onboard F/A-18E/F aircraft), and the BRU-61 bomb rack modification (required for the F-35B/C platform launch). The DoN also requests \$91.3M in WPN to procure 750 All-Up-Round weapons.

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

The FY 2019 President's Budget requests \$6.3 million of RDT&E for AARGM Foreign Material Assessment; \$15.3 million for AARGM Global Positioning System M-Code development, AARGM Derivative Program transition, and Block 1 follow-on development; \$99.2 million of RDT&E for AARGM Extended Range development; and \$188.0 million of WPN for production of 257 AARGM Block 1 modification kits for integration into All-Up-Rounds and Captive Training Missiles.

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

The FY 2019 President's Budget requests \$6.8 million in RDT&E to complete JAGM integration onto the Marine Corps AH-1Z platforms and \$24.1 million in WPN to procure 71 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 as it provides an unprecedented precision guidance capability to the DoN rocket inventories, thereby significantly improving accuracy and minimizing collateral damage.

The FY 2019 President's Budget requests \$108.8 million in PANMC for procurement of 3,686 APKWS II guidance section kits for use on both rotary-wing and fixed-wing platforms.

**Direct Attack Weapons and General Purpose Bombs**

Fully funding General Purpose Bombs and the Joint Direct Attack Munition (JDAM) line items are critical to building the DoN's direct attack weapons inventory. In the last forty-two months of ongoing contingency operations DoN aircraft have expended nearly two times the number of 500 lb JDAM kits than we have taken delivery of during the same period.

The FY 2019 President's Budget requests \$142.4 million in PANMC for Direct Attack Weapons and General Purpose Bombs and an additional \$180.9 million to procure 7,594 JDAM kits to enhance readiness and prepare for future contingencies.

**CONCLUSION**

Naval Aviation continues to operate forward – fully prepared for conflict in the full range of military operations while managing near-term service-life, mid-term capability improvements and long-term investments in research and development for delivery of future capabilities. We are building and sustaining a lethal, resilient force through balanced investments across readiness, capability and capacity. Naval Aviation is actively pursuing and seizing innovation and advantage wherever it can as we implement our vision to provide the right capability in the hands of the warfighter, on schedule, and in the most affordable manner possible.

**Addendum A****SAFETY  
(Part 1 of 2)****Physiological Episodes (PE)**

All Navy senior leadership views the occurrence of Physiological Episodes (PE) in our tactical aircraft and trainers as our number one aviation safety priority until we fully understand all causal factors and mitigate PEs as a risk to flight operations. To date, we have identified multiple interrelated causal factors but the entirety of the root cause(s) of physiological episodes remains unidentified. Mitigation efforts currently in place, to 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 operational environment with an acceptable level of risk.

For our T-45 aircraft we have reduced the overall PE rate substantially with over 30,000 flight hours flown and only seven minor events since the return to flight. Five of the seven 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. 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 stability of failure modes and improving the cockpit environment for our aviators. More work remains to be done, but mitigation and redesign efforts are producing positive results in all FA-18 variants. We are collaborating across the DoD to leverage research efforts to help characterize the cockpit environment to ensure we reach a long-range, holistic solution rather than interlaced mitigations in both current and future aircraft. We have investigated every line

of inquiry recommended by the NASA report to include measuring breathing gas quality at the mask. We are drafting a request for proposal for a new MIL-STD-3050 compliant On Board Oxygen Generating System (OBOGS) concentrator designed to replace the existing well performing but less capable 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 MIL-STD. The replacement OBOGS concentrator will be the first in the DoD inventory to comply with the MIL-STD that was created in 2015.

We have also assigned a Flag Officer to oversee a Physiological Episodes Action Team (PEAT). Together, our engineers, industry partners, physiologists and outside support from groups as diverse as the National Aeronautics and Space Administration and Naval Medical Research Units are working diligently to find a solution to the physiological episodes issue.

RDML Joyner, the Department's PEAT lead, recently testified to the House Armed Services Committee on February 6, 2018. Her formal statement provides a comprehensive update on all PE efforts to-date and the hearing transcript provides additional relevant data. Both can be found at:  
<https://armedservices.house.gov/legislation/hearings/addressing-physiological-episodes-fighter-attack-and-training-aircraft-0>

## **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 2015 through March 2018 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
FY16	1,098,519	18	1.64	26	2.37	216	19.66
FY17	1,072,156	25	2.33	33	3.08	242	22.57
FY18	500,414	8	1.6	22	4.40	114	22.78

The most recent (FY 2017-26 Mar 2018) DoN flight Class A mishaps include:

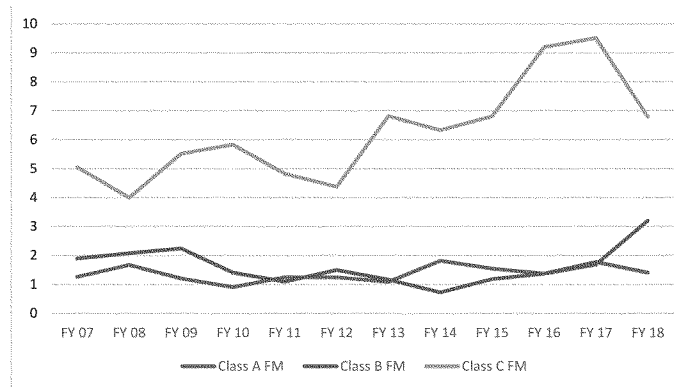
- 19 Mar 2018: (MCAS Futenma, Okinawa) CH-53E main rotor damper failed in flight and caused significant damage. No injuries.
- 14 Mar 2018: (NAS Key West, FL) F/A-18F crashed on short final, single engine. Two fatalities.
- 11 Dec 2017: (Tinker AFB, OK) E-6A struck birds during descent, leading to number 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. Three 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. Two 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.
- 27 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-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.
- 12 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/A-35B had an inflight weapons bay fire followed by an uneventful landing. No injuries.
- 25 Oct 2016: (Twentynine 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):

- 21 Feb 2018: (MCAS Camp Pendleton, CA) During aircraft startup, aerial observer was struck by tail rotor. One fatality.
- 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. (AGM)
- 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)
- 15 Dec 2016: (NAS Whidbey Island, WA) Canopy on EA-18G exploded/jettisoned resulting in severe injuries to two personnel. (AGM)

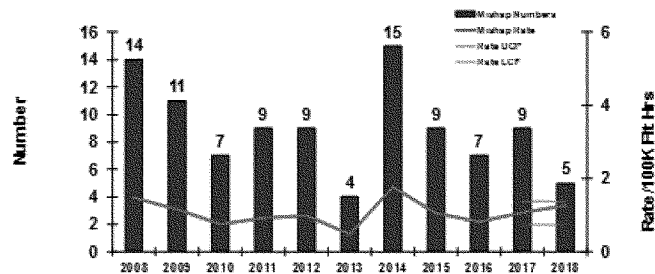


DoN Historical Mishap Rate Trend per 100K Flight Hours per Mishap Class  
(As of 26 Mar, 2018)



## CLASS A FLIGHT MISHAPS

Manned Aircraft Only



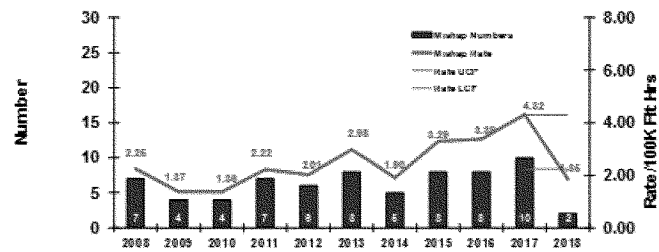
	26-Mar-18	26-Mar-17
CLASS A MISHAPS/MISHAP RATE FY COMPARISON:	5/1.26	2/0.50
FY17 MISHAPS/MISHAP RATE:	9/1.07	
10-YEAR AVERAGE (FY08-17) MISHAPS/MISHAP RATE:	9.40/1.05	

Class A Manned Flight MISHAP Historical Data for U.S. Navy



## CLASS A FLIGHT MISHAPS

Manned Aircraft Only



	26-Mar-18	26-Mar-17
CLASS A FM/FM RATE FY COMPARISON:	2/1.85	6/5.72
FY17 MISHAPS/MISHAP RATE:	10/4.32	
10-YEAR AVERAGE (FY08-17) MISHAPS/MISHAP RATE:	6.70/2.51	

### Class A Manned Flight MISHAP Historical Data for U.S. Marine Corps

UCI = Upper Confidence Interval LCI = Lower Confidence Interval

Rate values above the UCI or below the LCI infer a statistically significant change is probable. This is only an indicator. Significance cannot be determined until end-of-year. Values between the UCI and LCI infer that nothing significant has occurred to increase or decrease mishap rate.

**End of Addendum A**

**Vice Admiral Paul A. Grosklags**  
**Commander**  
**Naval Air Systems Command**

Vice Adm. Paul Grosklags is a native of DeKalb, Illinois. He graduated from the U.S. Naval Academy in 1982, is a graduate of the U.S. Naval Test Pilot School Class '99, and holds a Master of Science in Aeronautical Engineering from the Naval Postgraduate School.

After being designated a naval aviator in October 1983, he immediately reported to Training Squadron (VT) 3 at North Whiting Field in Milton, Florida, as a T-34C flight instructor.

Grosklags served operational tours with Helicopter Antisubmarine Squadrons (HS) 34 and 42, where he flew the SH-2F and SH-60B, respectively. Grosklags made multiple deployments with the USS John Hancock (DD 981), USS Donald B. Beary (FF 1085), USS Comte de Grasse (DD 974) and USS Leyte Gulf (CG 55). He later served as both executive and commanding officer of Helicopter Training Squadron (HT) 18.

Grosklags' acquisition tours include engineering test pilot and assignments as MH-60R assistant program manager for systems engineering, H-60 assistant program manager for test and evaluation, MH-60R deputy program manager and ultimately as program manager for Multi-Mission Helicopters (PMA-299), during which time the MH-60R was successfully introduced to the fleet. Grosklags also served as operations officer and subsequently as deputy program executive officer for Air Anti-Submarine Warfare, Assault and Special Mission Programs (PEO(A)).

Grosklags has served flag tours as commander, Fleet Readiness Centers and Naval Air Systems Command (NAVAIR); assistant commander for Logistics and Industrial Operation, NAVAIR, vice commander, PEO(A) and principal military deputy for the Assistant Secretary of the Navy (Research, Development & Acquisition). In October 2015, he assumed responsibilities as Commander, Naval Air Systems Command.

He has more than 5,000 military flight hours in numerous types of rotary and fixed-wing aircraft. Grosklags is a proud but humble co-owner of the Green Bay Packers and works weekends providing free labor on his wife's farm.

Updated: 26 October 2015

**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 CENTCOM 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 Star, 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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HOUSE ARMED SERVICES COMMITTEE  
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES  
UNITED STATES HOUSE OF REPRESENTATIVES

DEPARTMENT OF THE AIR FORCE

PRESENTATION TO THE  
HOUSE ARMED SERVICES COMMITTEE  
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES  
UNITED STATES HOUSE OF REPRESENTATIVE

HEARING DATE/TIME: April 12, 2018/1400

SUBJECT: Air Force, Force Structure and Modernization Programs

STATEMENT OF:

Lt. Gen. Arnold W. Bunch, Jr. USAF  
Military Deputy, Office of the Assistant Secretary  
Of the Air Force (Acquisition)

Lt. Gen. Jerry "JD" Harris Jr., USAF  
Deputy Chief of Staff  
(Strategic, Plans and Requirements)

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HOUSE ARMED SERVICES COMMITTEE  
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES  
UNITED STATES HOUSE OF REPRESENTATIVES

## INTRODUCTION

Chairman Turner, Ranking Member Tsongas and distinguished members of the Tactical Air and Land Forces Subcommittee, thank you for the opportunity to provide an update on the United States Air Force Modernization programs and Force Structure. For the past 70 years, from the evolution of the jet aircraft to the advent of the ICBM, satellite-guided bombs, and remotely piloted aircraft, the Air Force has been breaking barriers as a member of the finest joint warfighting team on the planet. Today's demand for Air Force capabilities continues to grow as the United States now faces a more competitive and dangerous international security environment than we have seen in generations.

In, through and from air, space, and cyber, the fabric of our Air Force weaves multi-domain effects and provides joint warfighters the blanket of protection and ability to power project America's full range of combat capabilities...we are 'Always There'. With global trends and intensifying pressure from major challengers, our relative advantage in air and space is eroding in a number of critical areas. Any American weakness emboldens competitors to subvert international order and challenge the alliance and partnership network that underpins it. We are supporting Combatant Commander requirements in response to growing challenges from Russia, China, North Korea and Iran, in addition to the ever present counterterrorism mission in the Middle East and around the world.

While our forces have been heavily engaged in deterring or addressing these operational challenges, our adversaries have taken the opportunity to invest in and advance their own capabilities. To address ever narrowing capability gaps, the Air Force needs your support in the form of, steady and predictable appropriations that fulfill our annual budget requests. In accordance with the National Defense Strategy (NDS), this budget prioritizes long-term



competition with China and Russia. The Air Force must build a more lethal and ready force, strengthen alliances and partnerships, and deliver greater, more affordable performance. Future wars will be won by those who observe, orient, decide and act faster than adversaries in an integrated way across all domains. Budget levels under the current Budget Control Act restrictions will force the Air Force to continue making unacceptable tradeoffs between force structure, readiness, and modernization. With your support of our Fiscal Year (FY) 2019 budget request, the Air Force will drive innovation, reinforce budget discipline and affordability, and deliver performance with the funds entrusted to us. This budget reinforces the Air Force commitment to our allies and international partners through programs such as the European Deterrence Initiative and Indo-Pacific security initiatives.

Stitched together, the fabric of our Air Force weaves multi-domain effects and provides U.S. servicemen and women the blanket of protection and the ability to power project America's full range of combat capabilities. Make no mistake, your Air Force is always there.

#### **READINESS IN A CHANGING WORLD**

Being "always there" comes at a cost to our Airmen, equipment, and infrastructure, and we are now at a decision point. Sustained global commitments and funding constraints have affected capacity and capability for a full-spectrum fight against a near-peer adversary. In 2013, sequestration forced hard decisions that sacrificed the readiness and size of the Total Force in order to ensure our technological superiority against future adversaries. In the FY16 and FY17 budgets, we made the necessary adjustments to balance near-term readiness with future modernization, but due to continuous combat operations, reduced manpower, an aging fleet, and inconsistent funding, our readiness has suffered.

In a world of increasing threats, stronger adversaries and a persistent war against violent extremism, there is a greater disparity between commitments and the resources necessary to achieve our national security objectives. Instead of rebuilding readiness for near-peer conflicts, your Air Force is globally engaged in operations against lesser-equipped, but still highly lethal and adaptive enemies. Airmen serve at home and abroad to underpin joint force success but it comes at the expense of full-spectrum readiness.

To regain full-spectrum readiness, The Air Force must rebuild our Operational Training Infrastructure. This includes not only live, virtual and constructive environments, but also the ranges and space necessary to train against high-end threat systems in a multi-domain environment. Once established, our 4<sup>th</sup> and 5<sup>th</sup> generation fighter units need relief from current tasking against low-end adversaries in order to train for emerging threats. We prioritized this initiative by creating a directorate on the Air Staff dedicated solely to this monumental effort. However, the complexity of linking all of the systems needed for tomorrow's fight and deconflicting training requires both manpower and finances.

Your Air Force needs permanent relief from the current BCA caps, sufficient funding, flexible execution authority, and manpower to recover full-spectrum readiness. We will continue to do all we can to innovate, transform, and improve how we maximize our resources.

#### **PEOPLE**

Airmen are our greatest resource and our Air Force needs to increase end strength to meet national security requirements. Manpower shortfalls in key areas remain the number one issue limiting readiness and is our top priority as we rebuild squadrons across the Air Force. At the start of 2016, our end strength stood at 311,000 active duty Airmen, down from more than 500,000 during Desert Storm—a 38 percent decrease. Though we appreciate your support to build the

Active Duty force up to about 325,100 in 2018, we will still be stretched to address national security requirements.

To improve readiness and attain manning levels matching our mission requirements, we worked with the Secretary of Defense to address personnel shortages in the FY 2019 President's Budget to include an increase in our Active Duty end strength to 329,100, and Total Force military end strength to 506,200 (adding approximately 4,700 personnel across the Active, Guard, and Reserve components). Our Total Force model (incorporating our Active Duty, Guard, Reserve, civilians, and our contracted capabilities) not only recognizes the value of an integrated team, but helps guarantee today's and tomorrow's capability. We will develop plans to address experienced personnel and critical skills shortfalls in a number of career fields such as aircrew, space nuclear, cyber and battlefield Airmen.

As a Service, we face an aircrew shortage crisis across all disciplines. Your Air Force has the world's finest aircrew who enable an incomparable duality of global mobility and combat lethality. As airlines continue hiring at unprecedented rates, they draw away our experienced pilots. Without a healthy pool of pilots, we risk the ability to provide airpower to the nation.

Pilots are strategic national assets and the pilot crisis extends beyond the Air Force and military. It is a national problem which requires senior-level attention in Congress, the Commercial Industry, and the DoD. To address this national challenge, since 2014 the 'Air Force -Airline Collaboration', formally known as the National Pilot Sourcing Forum has increased efforts to effectively utilize and train an adequate number of pilots to meet our nation's pilot demand signal.

However, pilot retention has declined for five straight years. At the conclusion of FY17 the Air Force had a rated manpower shortfall (including remotely piloted aircraft pilots) of approximately 2,000 pilots across the Total Force. This shortfall is most pronounced in our regular

Air Force fighter community which is short more than 950 pilots. We are grateful for your support to increase the pilot bonus, and we will continue to ensure our retention programs are appropriately sized and utilized. Your Air Force will utilize the FY17 NDAA Aviation Bonus authority (\$35K per year maximum) and implement a tiered-model using a directed business case model to identify areas of greatest need.

Retaining our pilot force goes beyond financial incentives...it is about culture. Your Air Force is implementing many non-monetary efforts to reinvent the culture and improve the quality of life and quality of service for our Airmen. We have reduced additional duties and superfluous training courses, as well as acquired contracted support in fighter squadrons to perform burdensome administrative tasks, enabling our pilots to focus on their primary duty: flying. We have also increased the transparency of the assignment process and increased flexibility to promote family stability. Your Air Force is exploring opportunities to reduce deployment burdens by enabling more Air Reserve Component volunteers for 179/365-day deployments. We must show our Airmen that we are creating a culture that reminds them they serve in something bigger than themselves...defending America.

In addition to retaining our talented personnel, the Air Force must also increase pilot production and absorption while reducing requirements. The increased end-strength provided in the FY17 NDAA will allow us to maximize the training pipeline and fill out under-manned units, which are vital to our recovery. Our fighter pilot production targets have increased 15% (to 335 Total Force pilots) per year while we surge the number of new aircraft maintainers by more than 1,500 per year to better man flying squadrons and reestablish sortie generation rates with a completion target of 3-5 years. However, other options beyond manpower increases exist to season our young pilots while accelerating readiness recovery.

## **SAFETY ISSUES**

Over the past year the Air Force has continued its 10-year trend of reducing Class A and B mishaps. In fact, FY17 was the second safest year in Air Force history. Our trends indicate that the Air Force's efforts to prevent mishaps through all means possible, including material, non-material, and technological improvements, is having the desired effects. Although we have not achieved a rate of zero Class A and B mishaps, we have made great strides in several areas.

The Air Force remains dedicated to solving the challenge of physiological events across the Air Force and other services. Physiological events are not isolated to one aircraft or to one oxygen delivery subsystem. As a result, there is almost certainly not a single solution. The Headquarters Air Force Unexplained Physiological Event Integration Team and the Navy's Physiological Episodes Action Team, both led by general officers, continue to work closely together to thoroughly investigate this issue. Together, they have engaged a broad range of internal and external partners, including subject matter experts from the Air Force and Navy, National Aeronautics and Space Administration, Federal Aviation Administration, industry, academia, dive communities, and medical field to develop a successful resolution and keep our aviators safe.

A major factor in reducing the loss of Airmen from fatal mishaps in fighter/attack aircraft is the development and fielding of the Automatic Ground Collision Avoidance System (Auto G-CAS). To date, this advancement has produced seven automatic recoveries and saved at least eight lives in the F-16. Auto G-CAS has proven its worth and we have accelerated our effort to implement this life and resource-saving system on our F-35 fleet with flight testing slated to begin April of 2019.

Another challenge we face every day is aircraft-wildlife strikes. In Fiscal Year 2017, we sustained 3,990 wildlife strikes, costing more than \$30M, or \$1.7M per 100,000 flight hours. We continue to address this challenge through many different efforts and have successfully reduced this rate by 50% since FY14.

The Air Force strives to prevent mishaps by finding, highlighting, and mitigating hazards before they become mishaps. The Air Force employs a set of proactive programs to help commanders at all levels accomplish this goal. We recently launched a smartphone and personal device application that enables Airmen around the world to quickly and easily report hazards. Mitigating hazards before they injure our Airmen or damage and degrade our combat capabilities fundamental to the Air Force's proactive mishap prevention program.

#### **FORCE STRUCTURE AND MODERNIZATION**

The Air Force budget request of \$156.3 billion for FY19 builds on the progress made in 2018 to restore the readiness of the force, increase lethality, and cost-effectively modernize. Sustaining these efforts requires predictable budgets at the requested funding levels. Testament to this reality are the force structure and modernization challenges resultant of past underfunding and volatile budget landscapes. Acknowledging that the Bipartisan Budget Agreement increased the Department topline, the Air Force developed a \$1.9B targeted UPL that aligns and accelerates National Defense Strategy. The FY19 unfunded list prioritizes space requirements to deliver capability to the Joint Force at the speed of relevance, Nuclear and Multi-domain Command & Control to enable a more lethal force and support NC3 modernization, and classified programs to deter adversaries by keeping them off balance and unsure of our capability.

Five years ago during a period of severe fiscal constraints, the Air Force rebalanced its fighter force structure using analysis which showed the Air Force could decrease fighter force

structure by approximately 100 aircraft if we were willing to accept higher risk. This resulted in the current fighter inventory of approximately 1,145 primary mission aircraft and slightly more than 1,950 total aircraft. The current inventory complies with FY16 NDAA language on the limitation on retirement of Air Force fighter aircraft; however, sustained operational demand for rotational fighter presence continues unabated.

The FY19 President's Budget (PB) retains 56 combat squadrons and lays the foundation for fighter force recapitalization. The Air Force is in the process of determining how many squadrons we need to deliver the combat capability required to execute the new defense strategy.

Due to underfunding modernization for over a decade, the Air Force must also manage a bow wave in modernization over the next ten years. The budget funds our priority modernization initiatives with the purchase of 48 F-35 fighters in FY19 and 258 F-35A aircraft over the next five years in addition to upgrading F-16 and F-15 C/D aircraft to retain affordable capacity. Integrating the F-35 and its unparalleled global precision attack capability with fourth-generation aircraft as well as space and unmanned aircraft, will help us maintain air superiority in highly contested environments.

However, the Air Force's ability to ensure the freedom from attack, freedom to attack, and freedom to maneuver that we provide to the Joint warfighter is being increasingly challenged by potential adversaries who are developing and implementing advanced Anti-Access / Area Denial (A2/AD) capabilities. Adversary A2/AD technologies continue to advance at a pace where they will soon out-match our current capabilities, and are being proliferated world-wide as demonstrated by the introduction of advanced Surface-to-Air Missiles in Syria. Modernizing our fleet to address this shrinking gap in capability is one of our top priorities.

Increasing lethality includes our ability to gain and maintain air superiority when and where needed against potential adversaries in 2030 and beyond. Over the next five years, we will develop an integrated family of systems that can establish and maintain air superiority in a contested environment. The FY19 budget includes \$11.0 billion as part of a \$63.8 billion effort over the five-year plan. This will be a multi-domain effort with a renewed emphasis on electronic warfare, networked capabilities, and control of the electromagnetic spectrum.

Fighter fleet capacity is predicated on the capabilities of the aircraft that make up that fleet and thus, finding the right balance of 5th and 4th generation aircraft will remain fluid as we continually assess evolving threats. The “4th/5th” generation balance discussion is quickly becoming a “5th/6th” generation balance discussion and the FY19 PB adds \$2.7 billion over the Future Years Defense Program (FYDP) to fund the next generation of air dominance capabilities. The Air Superiority Family of Systems will utilize an agile acquisition strategy in order to facilitate parallel development and prototyping activities that puts the Air Force on a timeline needed to close air superiority capability gaps identified in the Air Superiority 2030 Flight Plan. The Air Superiority Family of Systems will provide a complementary capability to the F-35A and will not impact JSF program objectives.

The F-35 continues to be an acquisition priority as its capabilities ensure lethality and survivability against emerging high-end threats. The program recently delivered full (Block 3F configuration) warfighting capability and system development and demonstration is on track to complete this calendar year. The price per copy of an F-35A is now less than \$100 million and the FY19 PB procures 48 aircraft for the Air Force as the program readies to jump to 54 a year in FY21. FY19 will also see the F-35 modernization program begin to shift to a Continuous Capability Development and Delivery (C2D2) acquisition strategy that will deliver continuous



modernization, enhancements, and improvements that will deliver Block 4 capability. This capability is geared toward meeting the estimated threat in the 2025 timeframe and beyond. We cannot emphasize enough how important it is that we fully fund Block 4 to prevent delaying required capabilities for American and Coalition warfighters, including the integration of additional weapons and upgrades to the electronic warfare system, data link systems and radar.

The F-22, currently the only U.S. fighter capable of operating in highly contested environments, is also an integral piece of the Air Force's force structure modernization plan. Its stealth, super cruise, integrated avionics and sensors combine to deliver the Raptor's unique capability. We plan to retain the F-22 until the 2060 timeframe, and the FY19 PB reflects this commitment as we look to increase its capabilities and mission effectiveness through a myriad of modernization efforts. These efforts include sensor enhancements, datalink upgrades, enhanced GPS and the integration of a new helmet mounted display cueing system.

In addition to pursuing new capabilities and modernizing fifth generation fighters, the Air Force also seeks to extend the service life and modernize critical capabilities of key fourth generation aircraft. Doing so will help maintain Service capacity and readiness to meet the needs of the Warfighter while ramping up the F-35 production line and developing the Air Superiority Family of Systems.

FY19 continues the increase in the Air Force's commitment to fielding a future penetrating counterair capability following the recommendations of the Air Superiority 2030 Enterprise Capability Collaboration Team. As our adversary capabilities advance, a new Next Generation Air Dominance (NGAD) capability will play a critical role in targeting and engaging future threats in the most highly contested environments. It will also be instrumental as a node in the larger network, providing data from its sensors to enable complementary weapon systems. This

capability will provide the survivability, lethality and persistence to meet emerging worldwide threats across the spectrum of conflict.

The Air Force continues to assess fleet sustainability and alternatives for meeting warfighter close air support (CAS) demands, particularly in permissive environments. The A-10 has been the backbone of the CAS mission for more than 40 years and has proven to be the least costly 4<sup>th</sup> generation fighter platform but has exceeded its original service life. This year the original A-10 re-winging program completes as the 173<sup>rd</sup> wing set will be installed later this summer. Additionally, a new re-winging program will begin third quarter of FY18 with the release of a Request for Proposals for up to 109 additional wing replacement sets. The new wing program will aim to avoid any further groundings beyond 2025 and will ensure a minimum of six combat squadrons remain in service until 2032. In addition to re-winging efforts, the Air Force is exploring ways to augment the A-10 fleet.

In FY17, the Air Force continued experimentation efforts, including executing Phase I of the Light Attack Experiment. This was a live-fly event conducted at Holloman Air Force Base, New Mexico in August 2017 which assessed the military utility of various non-developmental, light-attack platforms. This first phase of the experiment allowed the Air Force to assess the potential of these off-the-shelf, light attack aircraft to accomplish various permissive, close air support missions. The Air Force leveraged Other Transaction Authority (OTA) agreements, including industry cost-share agreements, to execute the experiment within *five months of authorization*. The Air Force plans to hold Phase II of the Light Attack Experiment in Fiscal Year 2018 as we develop the acquisition strategy for a potential procurement in the coming years.

To ensure the F-16's lethality and air dominance we are pursuing an active electronically scanned array radar upgrade that offers advanced capabilities and improved reliability to support

USNORTHCOM's critical Aerospace Control Alert (ACA) mission. The Air Force has an initial 72 radars on contract, with a plan to procure and field up to an additional 300 over the next five years. Installation of these radars are slated to begin next year, with all ACA units having the capability by the end of 2021. We are also upgrading the F-16's mission computer, display generator, electronic warfare components, and the ALQ-131 self-protection jamming pod to enable advanced technology jamming techniques. Additionally, the legacy service life extension program will extend the F-16 airframe structural service life from the current 8,000 hours to 12,000+ hours, adding fifteen to twenty years of service for selected F-16s.

Along with the F-16, the Air Force expects the F-15E to be an integral part through at least 2040, and we are pursuing a new electronic warfare self-protection suite, the Eagle Passive/Active Warning Survivability System for the Strike Eagle fleet. The F-15C/D fleet is funded through the FYDP and will undergo multiple offensive and defensive upgrades to ensure its warfighting effectiveness until any recapitalization plans are finalized.

To transform at the pace necessary to meet the challenges of global competition, as well as operations in a denied environment, the Air Force must develop an integrated force able to fight across all domains. The future security environment is more complex and volatile than any other we have experienced, demanding a more lethal, resilient, and rapidly innovating Air Force. The Air Force Warfighting Integration Capability (AFWIC) is how the Air Force will answer this challenge to rapidly evolve a more lethal force. AFWIC will drive enterprise-wide integration and future force design enabling the Air Force to rapidly transition into a networked multi-domain 21st Century force. AFWIC centralizes enterprise design and capability planning, identifies prioritized ways and means to guide resourcing priorities that improves Air Force lethality and enhances AF

capabilities for the joint and coalition fight. AFWIC is more than a re-organization. AFWIC evolves the way we design and plan in order to adapt and transform.

Previously, integration occurred at the 4-star level, and after independent plans, concepts, and budgets were already built. AFWIC integrates at the earliest and lowest possible levels, driving integration at the very beginning of concept development and future force design. AFWIC's centralized future force design, produced upfront, establishes a singular Air Force blueprint, sets priorities for investment, and appropriately aligns resources to implement the Air Force Strategy across a 15-year timeframe. Harnessing the ingenuity of the warfighter, AFWIC will be staffed by creative, innovative, and experienced personnel from every warfighting domain and functional capability who will leveraging their own experience and the insights of the MAJCOMs and Combatant Commands to pursue potential future force design options. This ecosystem of operators, engineers, and technologists will shepherd future force design elements from an innovative opportunity through concept exploration, experimentation, wargaming, and capability development, ultimately leading into the future force design.

By creating a future force design blueprint, and capability development guidance that more clearly links Strategy to Planning within the SPPBE process, the AFWIC enables the prioritization of resources to achieve the unified vision. When combined with centralized capability development, we are able to address our previously stovepiped modernization processes and provide clear priorities for the acquisition and technology development communities. By working together with the Commands, Requirements and Acquisition communities, and the planners & programmers in an iterative, collaborative, and fully teamed way, the AFWIC will fill a key design void with respect to previous processes. When combined, these process changes and activities

will allow the Air Force to more clearly and consistently articulate our strategy and priorities with a single voice and transform into a truly networked multi-domain force.

## **MUNITIONS**

Over the past year, the demand for munitions continues to grow. To meet this demand, the Air Force continues to work with the other services and industry partners to efficiently ramp production capacity across the preferred munitions programs. The 2019 Budget request continues to leverage overseas contingency operations funding to replenish the vast number of munitions expended to date in operations around the globe. The budget request also incorporates more Air Force base funding to build munitions inventories to support the National Defense Strategy and meet future operational requirements. The services continue to balance today's immediate needs with a long-term, sustainable capacity, ultimately fueling a more resilient industrial base for the future.

Hellfire missiles continue to provide a time-sensitive, direct-strike capability for our remotely-piloted vehicles and remain in high demand. Partnering with the Army, production capacity was ramped from 9,500 missiles per year in FY18 to 11,000 missiles per year starting in FY19. The Air Force plans to procure 4,338 missiles in FY19. With the other Services' and critical foreign military sales partners, the production line will remain funded to maximum production capacity for the foreseeable future.

The Joint Direct Attack Munition (JDAM) is also a weapon of choice for today's operators with an average of 50-70 expended daily to support ongoing operations. JDAM production capacity increased to 45,000 tailkits per year in FY18 to meet the needs of the services and FMS

partners. The Air Force plans to procure 36,000 tailkits in FY19 with Navy and FMS partners procuring the remaining 9,000 tailkits available in FY19.

Another significant achievement, the Air Force teamed with the Navy and industry to rapidly procure and field the Advanced Precision Kill Weapon System (APKWS). The Services have teamed with industry to ramp production from roughly 2,700 guidance kits per year to 20,000 guidance kits starting in FY19. The Air Force plans to procure 7,279 kits in FY19.

Small Diameter Bomb I (SDB I) continues to provide precision, lethal strike capacity with reduced collateral damage effects and increased load-out per sortie for our warfighters. The Air Force has ramped the line from 3,000 weapons per year in FY15 to 8,000 weapons in FY18. The Air Force plans to order 6,826 weapons in FY19 with 1,174 weapons for partner nations. All of these production increases expedite the inventory replenishment of our critical munitions and build stockpiles.

As the Air Force responds to current operational demands, we are also looking toward the future to ensure we are prepared to defend against more advanced threats as directed in the National Defense Strategy. Advanced weapons capabilities are necessary to address sophisticated threat systems. The FY19 budget request reflects the Air Force's plan to continue investing in advanced weapon capability, specifically with the Advanced Medium Range Air-to-Air Missile (AMRAAM), Joint Air-to-Surface Standoff Missile-Extended Range (JASSM-ER) and SDB II. These weapons provide unique capabilities in a more contested, anti-access/area denial (A2/AD) environment.

Production of AMRAAM missiles, a critical air dominance weapon, remained consistent with FY18 procurement levels as industry partners continue to work through parts obsolescence issues through the Form Fit Function Refresh (F3R) effort. JASSM-ER is the premier A2/AD

weapon for striking advanced ground threat systems, and production will remain at maximum capacity in FY19 and beyond. The Air Force plans to procure 360 missiles in FY19 while also improving the weapon's capabilities and addressing upcoming parts obsolescence issues. Finally, SDB II enters its fifth and final low-rate initial production lot in FY19, and in conjunction with the Navy, the Air Force's order of 510 weapons maximizes the production capacity as it prepares to ramp in FY20. Though not yet fielded, the SDB II will soon provide a key air-to-ground capability to kill mobile and fixed targets through adverse weather from standoff ranges.

#### **ROTORCRAFT**

The FY19 PB continues investment in your Air Force's critical rotorcraft modernization programs. The FY19 PB requests \$78.9 million for the CV-22 fleet to assist in execution of the National Military Strategy by providing transformational mission capability to special operations forces warfighters. The Air Force continues to make improvements to the CV-22 with modifications designed to improve reliability, survivability and capability. Future efforts will make the CV-22 more cost-effective, while ensuring the viability of its unique long-range payload capacity coupled with vertical take-off and landing capability.

The Air Force is the only Service with a dedicated force organized, trained, and equipped to execute theater-wide Personnel Recovery. The newly designated Combat Rescue Helicopter (CRH) will be specifically equipped to conduct Combat Search and Rescue across the entire spectrum of military operations. Due to the advancing age and current attrition rates of the HH-60G, the Air Force must continue to modify existing HH-60G helicopters while utilizing the Operational Loss Replacement program to meet Combatant Command requirements until we can fully recapitalize with the CRH program. In addition to 112 air vehicles, the CRH program provides for training devices, support equipment and the necessary post production support to

successfully field a replacement for the HH-60G. The Air Force has accelerated procurement and fully funded the CRH program across the FYDP to meet National Military Strategy objectives through Personnel Recovery missions. The FY19 PB requests \$96.1 million and \$1.1 billion for the HH-60G and CRH programs. Furthermore, the current UH-1N fleet supports a wide range of missions for five Major Commands. However, it does not meet speed, range, payload, or survivability requirements. The risk created by these capability gaps makes replacing the UH-1N a critical priority and a vital element of our nuclear enterprise reform initiative. The FY19 President's Budget requests \$288 million for the UH-1N Replacement Program which will fund the continued integration of non-developmental items, the non-recurring engineering work required to certify the modified air vehicle, and preparations for the test program. We are currently conducting the source selection and look forward to a contract award following resolution of the current GAO protest.

#### **SUMMARY**

The demand for air, space, and cyber power is growing and our Chief is committed to ensuring that America's Airmen are resourced and trained to fight alongside the Army, Navy, Marines and Coast Guard to meet national security obligations. The Air Force seeks to balance risk across capacity, capability, and readiness to maintain an advantage, however persistently unstable budgets and fiscal constraints have driven us to postpone several key modernization efforts. These delays created a rapid approaching modernization bow wave that includes programs critical to meet our capacity and capability requirements across all mission areas. The delays have also opened an opportunity to our competitors to close gaps and negate our traditional advantages.

The result of these changes by the world is a marked decrease in our technological advantage. The Air Force once had a decided advantage across all fronts. Today, the Air Force



has some advantage in some technological areas however potential adversaries are nipping at our heels or shoulder to shoulder with us in others. To address the shrinking technology gap, we must modernize and continue to invest in S&T so we can ensure we grow back the technology gap.

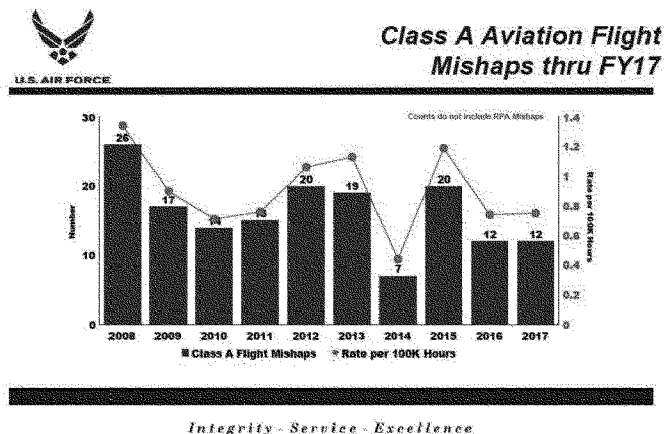
Although we are grateful for the recent fiscal relief, we still face uncertainty. The Air Force budget request of \$156.3 billion for Fiscal Year 2019 builds on the progress made in 2018 to restore the readiness of the force, increase lethality, and cost-effectively modernize. Sustaining these efforts requires predictable budgets at the requested funding level. It is critical to ensure we can meet today's demand for capability and capacity without sacrificing modernization for tomorrow's high-end fight against a full array of potential adversaries. With additional funds we can modernize faster, be ready sooner, and be capable of achieving our NDS tasks in a timely manner.

As critical members of the joint team, the USAF operates in a vast array of domains and prevails in every level of conflict. However, we must remain focused on integrating air and space capabilities across the domains through our core missions of Air Superiority, Space Superiority, Global Strike, and Rapid Global Mobility to continue to provide our nation with security it enjoys. We look forward to working closely with the committee to ensure the ability to deliver combat air power for America when and where we are needed.

## SAFETY ADDENDUM

FY 2017 USAF flight Class A mishaps include:

- 18 Sep 2017: (RAF Lakenheath, UK) F-15E Engine fire on take-off. No injuries
- 06 Sep 2017: (Nellis AFB, NV) Midair collision between two A-10s. Both pilots successfully ejected.
- 23 Jun 2017: (Dayton, OH) F-16 departed the runway on landing. Aircrew was injured.
- 21 Jun 2017: (Ellington Field, TX) F-16 bird strike on takeoff led to a high speed abort. Pilot ejected successfully.
- 13 Jun 2017: (Joint Base Elmendorf-Richardson, AK) F-22 engine malfunction in flight. No injuries.
- 13 Apr 2017: (CENTCOM AOR) C-17 engine compressor stall and oil pressure loss in flight. No Injuries.
- 05 Apr 2017: (Andrews AFB, MD) F-16 engine failure in flight. Pilot ejected successfully.
- 14 Mar 2017: (Cannon AFB, NM) U-28A crashed on a training sortie. Three fatalities.
- 06 Mar 2017: (Moody AFB, GA) A-29 crashed on a training sortie. Pilots ejected successfully.
- 4 Jan 2017: (Minot AFB, ND) B-52H had the #3 engine separate from the aircraft during flight. No injuries.
- 03 Dec 2016: (Osan AB, ROK) F-16 departed the runway on landing. Pilot ejected successfully.
- 01 Nov 2016: (Mountain Home AFB, ID) KC-10 boom loss in flight. No injuries.



### **Lieutenant General Arnold W. Bunch Jr.**

Lt. Gen. Arnold W. Bunch, Jr., is the Military Deputy, Office of the Assistant Secretary of the Air Force for Acquisition, the Pentagon, Washington, D.C. He is responsible for research and development, test, production, and modernization of Air Force programs worth more than \$32 billion annually.

General Bunch was commissioned in 1984 as a graduate of the U.S. Air Force Academy. He completed undergraduate pilot training in 1985. He completed operational assignments as an instructor, evaluator and aircraft commander for B-52 Stratofortresses. Following graduation from the Air Force Test Pilot School, General Bunch conducted developmental testing in the B-2 Spirit and B-52 and served as an instructor in each. Additionally, he has commanded at the squadron, group and wing levels. Prior to his current assignment, he was the Commander of the Air Force Test Center, headquartered at Edwards Air Force Base, California.

#### **EDUCATION**

1984 Bachelor of Science degree in civil engineering, U.S. Air Force Academy, Colorado Springs, Colo.  
 1991 Squadron Officer School, Maxwell AFB, Ala.  
 1994 Master of Science degree in mechanical engineering, California State University Fresno  
 1996 Army Command and General Staff College, Fort Leavenworth, Kan.  
 2000 Master of Science degree in national security strategy, National War College, Fort Lesley J. McNair, Washington, D.C.

#### **ASSIGNMENTS**

1. July 1984 - July 1985, Student, undergraduate pilot training, Columbus Air Force Base, Miss.
2. August 1985 - December 1985, Student, B-52 Combat Crew Training School, Castle AFB, Calif.
3. January 1986 - June 1990, Standardization and Evaluation Instructor Aircraft Commander, 325th Bomb Squadron, Fairchild AFB, Wash.
4. July 1990 - June 1991, Student, USAF Test Pilot School, Edwards AFB, Calif.
5. July 1991 - June 1992, Test Pilot, 6512th Test Squadron, Edwards AFB, Calif.
6. July 1992 - June 1995, Test Pilot, 420th Test Squadron, Edwards AFB, Calif.
7. June 1995 - June 1996, Student, Army Command and General Staff College, Fort Leavenworth, Kan.
8. July 1996 - July 1999, Chief, B-1 Test and Evaluation, B-1 System Program Office, Wright-Patterson AFB, Ohio
9. August 1999 - June 2000, Student, National War College, Fort Lesley J. McNair, Washington, D.C.
10. June 2000 - July 2002, Commander, 419th Flight Test Squadron, Edwards AFB, Calif.
11. August 2002 - April 2003, Chief, Senior Officer Management, Air Force Materiel Command, Wright-Patterson AFB, Ohio
12. April 2003 - June 2004, Deputy Chief, Combat Forces Division, the Pentagon, Washington, D.C.
13. June 2004 - January 2006, Director, Munitions Directorate, Air Force Research Laboratory, Eglin AFB, Fla.
14. January 2006 - May 2008, Commander, 412th Test Wing, Edwards AFB, Calif.
15. June 2008 - March 2010, Vice Commander, Air Armament Center, Eglin AFB, Fla.
16. March 2010 - June 2011, Director and Program Executive Officer for the Fighters and Bombers Directorate, Aeronautical Systems Center, Wright-Patterson AFB, Ohio
17. June 2011 - June 2012, Commander, Air Force Security Assistance Center, AFMC, Wright-Patterson AFB, Ohio
18. June 2012 - June 2015, Commander, Air Force Test Center, Edwards AFB, Calif.
19. June 2015 - present, Military Deputy, Office of the Assistant Secretary of the Air Force (Acquisition)

#### **FLIGHT INFORMATION**

Rating: command pilot  
 Flight hours: more than 2,500 hours  
 Aircraft flown: B-52, B-2, KC-135, F-16, T-38 and others

**MAJOR AWARDS AND DECORATIONS**

Legion of Merit with two oak leaf clusters  
Meritorious Service Medal with five oak leaf clusters  
Aerial Achievement Medal with oak leaf cluster  
Air Force Commendation Medal  
Air Force Achievement Medal  
Combat Readiness Medal  
National Defense Service Medal with oak leaf cluster  
Global War on Terrorism Service Medal

**EFFECTIVE DATES OF PROMOTION**

Second Lieutenant May 30, 1984  
First Lieutenant May 30, 1986  
Captain May 30, 1988  
Major Dec. 1, 1995  
Lieutenant Colonel Sept. 1, 1998  
Colonel June 1, 2004  
Brigadier General May 7, 2010  
Major General Aug. 23, 2013  
Lieutenant General June 24, 2015

(Current as of June 2015)

**Lieutenant General Jerry D. Harris Jr.**

Lt. Gen. Jerry Harris is Deputy Chief of Staff for Strategic Plans and Requirements, Headquarters U.S. Air Force, Washington, D.C. In support of the Chief of Staff and Secretary of the Air Force, General Harris leads the development and integration of the Air Force strategy, long-range plans and operational capabilities-based requirements. He directs and coordinates activities ensuring the Air Force builds and employs effective air, space and cyber forces to achieve national defense objectives.

General Harris entered the Air Force in 1985 as a graduate of the ROTC program at Washington State University. He has served as a flight commander, operations officer, weapons officer and inspector general. The general served on the staffs of two numbered Air Forces and one major command, all in operations. He has also served as the Combined Air and Space Operations Center Battle Director for operations Iraqi Freedom and Enduring Freedom. General Harris has commanded at squadron, group and wing levels. Prior to his current assignment, General Harris was the Vice Commander, Air Combat Command, Langley Air Force Base, Virginia, responsible for organizing, training, equipping and maintaining combat-ready forces for rapid deployment and employment while ensuring strategic air defense forces are ready to meet the challenges of peace time air sovereignty and wartime defense. General Harris is a command pilot with more than 3,100 flying hours in the F-16.

**EDUCATION**

1985 Bachelor of Science in Mechanical Engineering, Washington State University  
 1992 Squadron Officer School, Maxwell AFB, Ala  
 1997 Air Command and Staff College, Maxwell AFB, Ala.  
 1997 Master of Science in Aeronautical Science Technology, Embry-Riddle Aeronautical University, Daytona Beach, Fla.  
 1998 School of Advanced Airpower Studies, Maxwell AFB, Ala.  
 1998 Master of Science in Airpower Art and Science, School of Advanced Airpower Studies, Maxwell AFB, Ala.  
 1998 Armed Forces Staff College, Norfolk, Va.  
 2001 Air War College, by correspondence  
 2006 National Defense College, New Delhi, India  
 2011 Capstone General and Flag Officer Course, National Defense University, Washington, D.C.

**ASSIGNMENTS**

1. February 1986 - January 1987, Student, undergraduate pilot training, Williams AFB, Ariz.
2. January 1987 - April 1987, Student, AT-38B lead-in fighter training, Holloman AFB, N.M.
3. April 1987 - December 1987, Student, F-16 B-Course, MacDill AFB, Fla.
4. December 1987 - July 1989, Chief, Current Operations Division; Squadron Assistant Programmer; Training Officer; and Mobility Officer, Nellis AFB, Nev.
5. August 1989 - January 1992, Chief of Weapons and Tactics and Air-To-Surface Weapons Officer, Moody AFB, Ga.
6. January 1992 - February 1992, Student, Squadron Officer School, Maxwell AFB, Ala.
7. February 1992 - March 1994, Chief of Mid-range Programming and Student, Fighter Weapons School, Luke AFB, Ariz.
8. March 1994 - June 1996, Weapons and Tactics Flight Commander; Chief of Wing Weapons; and Chief of Squadron Weapons, Eielson AFB, Alaska
9. July 1996 - July 1998, Student, School of Advanced Airpower Studies and Air Command and Staff College, Maxwell AFB, Ala.
10. July 1998 - September 1998, Student, Armed Forces Staff College, Norfolk, Va.
11. September 1998 - March 1999, NATO Joint Staff Officer, Long-range Plans, Plans and Policy, Headquarters, Southern Region Air Command, Naples, Italy
12. March 1999 - August 2000, Chief of Strategy, Crisis Action Group, Headquarters Southern Region

Air Command, Naples, Italy

13. September 2000 - January 2001, Student, F-16 requalification, Luke AFB, Ariz.
14. January 2001 - February 2003, Operations Officer and Chief of Standardization and Evaluation, 20th Operations Group; and assistant Director of Operations, 79th Fighter Squadron, Shaw AFB, S.C.
15. March 2003 - February 2005, Commander, 79th Fighter Squadron, Shaw AFB S.C.
16. March 2005 - July 2005, Staff Director and Inspector General, 20th Fighter Wing, Shaw AFB S.C.
17. July 2005 - December 2005, Deputy Commander, 20th Operations Group, Shaw AFB S.C.
18. January 2006 - January 2007, Student, National Defense College, New Delhi, India
19. January 2007 - July 2008, Commander, 505th Training Group, Hurlburt Field, Fla.
20. July 2008 - November 2008, Director of Air, Space and Information Operations, 13th Air Force, Hickam AFB, Hawaii
21. November 2008 - September 2009, Commander, 8th Fighter Wing, Kunsan Air Base, South Korea
22. September 2009 - September 2010, Assistant Director of Operations, Plans, Requirements and Programs, Headquarters Pacific Air Forces, Hickam AFB, Hawaii
23. September 2010 - September 2012, Commander, 56th Fighter Wing, Luke AFB, Ariz.
24. September 2012 - March 2014, Vice Commander, 5th Air Force, Yokota Air Base, Japan
25. March 2014 - April 2015, Director of Programs, Office of the Deputy Chief of Staff for Strategic Plans and Programs, Headquarters U.S. Air Force, Washington, D.C.
26. April 2015 - February 2017, Vice Commander, Air Combat Command, Joint Base Langley-Eustis, Va.
27. February 2017 - Present, Deputy Chief of Staff for Strategic Plans, Programs, and Requirements, Headquarters U.S. Air Force, Washington, D.C.

#### **SUMMARY OF JOINT ASSIGNMENTS**

September 1998 - August 2000, NATO Joint Staff Officer, Long-range Plans, Plans and Policy; and Chief of Strategy, Crisis Action Group, Headquarters Southern Region Air Command, Naples Italy, as a major

#### **FLIGHT INFORMATION**

Rating: command pilot

Flight hours: more than 3,300

Aircraft flown: F-16, T-37, T-38, Mig-29 and Mig-21

#### **AWARDS AND DECORATIONS**

Distinguished Service Medal

Legion of Merit with two oak leaf clusters

Defense Meritorious Service Medal

Meritorious Service Medal with two oak leaf clusters

Air Medal with three oak leaf clusters

Aerial Achievement Medal

Air Force Commendation Medal with two oak leaf clusters

Joint Service Achievement Medal

National Defense Service Medal with bronze star

Southwest Asia Service Medal with three bronze stars

Kuwait Liberation Medal (Kingdom of Saudi Arabia)

Kuwait Liberation Medal (government of Kuwait)

#### **EFFECTIVE DATES OF PROMOTION**

Second Lieutenant May 11, 1985

First Lieutenant Sept. 1, 1987

Captain Sept. 1, 1989

Major Sept. 1, 1995

Lieutenant Colonel April 1, 2000

Colonel Jan. 1, 2006

Brigadier General Nov. 3, 2010

Major General June 27, 2014

Lieutenant General Feb. 22, 2017

(Current as of February 2017)

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**QUESTIONS SUBMITTED BY MEMBERS POST HEARING**

APRIL 12, 2018

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#### QUESTIONS SUBMITTED BY MR. TURNER

Mr. TURNER. Please describe the increase in capability that the K model CH-53 will provide the Marine Corps and is the CH-53K program still on schedule?

General RUDDER. The CH-53K provides nearly three times the current CH-53E lift capability under the same ambient conditions, and is the only fully marinized, heavy-lift rotorcraft capable of supporting current and future warfighting requirements. The CH-53K will be a game changer for the MAGTF by providing unprecedented heavy lift capability and capacity, along with increased range, interoperability, and survivability at approximately the same projected O&S cost as the legacy CH-53E. Regarding the program schedule, most major test discoveries are behind us and the aircraft is performing well. However, achieving all credited test points has proven more time consuming than expected. Due to a number of factors NAVAIR/Marine Corps has informed the defense committees that they have underfunded the R&D account for FY19 and will need to increase the FY19 R&D funding to accommodate the additional push in testing for both FY19 and FY20. There will be an increase in R&D funding compared to previous PB projections. While this funding increase is significant, it covers unanticipated shortfalls.

Mr. TURNER. Regarding the Marine Corps' F-35 procurement plan, you already have F-35B IOC squadrons. How do you plan to employ the F-35C? Could you use more of them?

General RUDDER. The Marine Corps' F-35Cs will be integrated into United States Navy Carrier Strike Group (CSG) deployments with the Carrier Air Wing as 10-plane squadrons; this is in support of the USMC and USN TACAIR Integration (TAI) policy. When the USMC F-35C squadrons are not assigned to a USN Master Aviation Plan (MAP) carrier air wing deployment, they are incorporated into the USMC deployment rotations to meet global force requirements. The first USMC F-35C squadron stands up in fiscal year 2020. Timely procurement of the Marine Corps' F-35Cs is a priority in order to meet Department of the Navy TAI deployments. Due to the planned integrated deployments, unfunded and congressional additions of F-35Cs for the USMC have a greater immediate impact than F-35B additions. This is due to increased F-35C training requirements, fleet replacement squadron production requirements, and the necessity to build and source squadrons with enough F-35Cs to train with, deploy with, and have ready while aircraft are being modified as part of the F-35 program continuous capability development and delivery (C2D2) modification and modernization plan. It is in this light that we are currently assessing the requirement for additional F-35Cs—beyond what is currently programmed. The F-35 modernization plan is mapped in detail over the next decade, both in terms of the technologies that we pursue and in terms of managing our fleet so that we can modify earlier lot aircraft and seamlessly incorporate new developments into the production line. This aircraft will meet operational requirements for decades with the long term view to continuously improve capabilities designed to counter and win against pacing threats.

Mr. TURNER. The Chief of Naval Operations has described all of the attributes which increase naval power and mentioned the need to “have your magazines full” when he describes the “ready fleet.” How do the weapons procurement investments in the fiscal year 2019 budget request make the fleet a more “ready fleet”?

Admiral CONN. Building a more lethal force is one of the lines of effort our National Defense Strategy (NDS) is centered on; and the “ready fleet” attribute you describe from the CNO's Heritage Foundation speech is one of six specific dimensions for increasing Naval Power to achieve the “Navy the Nation Needs”—which is the Navy's maritime expression of the NDS. With PB19 and the support of this Congress, all major weapons acquisition programs remain consistent or increase from FY18 levels and support the Navy's goal of increased capability and capacity, supporting the more lethal force line of effort. To ensure our superiority in all domains, PB19 improves weapons capability by funding additional RDT&E efforts in AIM-9X, SDB II, AARGM and LRASM (\$85M increase in RDT&E), while simultaneously ramping up these weapons procurement over FY18 levels (\$79M increase in WPN).

Mr. TURNER. The Navy has talked about utilization rates of the F/A-18 fleet being much higher than planned and how this negatively impacts aviation readiness. With no relief in sight on asset demand, when do you expect Super Hornets to begin reaching the end of their service life? Also, can you describe what efforts are underway to prevent the same challenges, which are plaguing the legacy fleet? Has the Navy taken steps to ensure adequate depot capacity, parts and engineering analysis to better predict what work is required to extend Super Hornet service life? Finally, what funding is dedicated to these efforts in the fiscal year 2019 budget request?

Admiral CONN. The first F/A-18E/F aircraft begin reaching the end of their service life this year with four airframes being inducted into F/A-18E/F Super Hornet Service Life Modification (SLM) in FY18. The Navy is aggressively pursuing Strike Fighter Inventory management strategies to include: a combination of new strike fighter procurement; funding depot efficiency enabling accounts; increasing airframe service life and capabilities through concurrent repairs and modifications; and procuring long-lead material and spares. The lessons learned from the legacy F/A-18A-D Hornet Service Life Extension Program (SLEP) inform evolving F/A-18E/F Super Hornet and EA-18G Growler SLM. Additionally, to validate fatigue analysis and inform corrosion discovery, Boeing engineers are completing the full destructive tear-down of two High Flight Hour Super Hornets in preparation for SLM. Initial SLM induction, and subsequent modifications and repairs, will be conducted by The Boeing Company under contract to Naval Air Systems Command, PMA-265. In addition to service life extension, SLM will also be used to validate engineering and fatigue analysis, evaluate corrosion discovery, and inform Engineering Change Proposal (ECP) development. The ultimate goal of several years of SLM events (FY 2018-FY 2022) is the development of standard "kitted" modification packages. The Department's PB-19 budget submission makes significant progress in reversing the downward trend in strike fighter capacity and readiness while also investing in a future Navy strike fighter force mix. The PB-19 Future Years Defense Program submission provides \$9.2 billion for 110 F/A-18E/F Block III and \$11.9 billion for 97 F-35C aircraft—an increase of 29 strike fighters over the PB-18 plan. Additionally, the Department is planning to procure 76 MQ-25 air vehicles to extend the range and reach of the Carrier Air Wing (CVW) and supplant the F/A-18E/F Super Hornet as the primary carrier-based inflight refueling aircraft, thereby decreasing F/A-18E/F utilization rates.

Mr. TURNER. What funding is the Air Force requesting in the FY2019 President's budget to support plans to extend the F-15C/D's service life?

General BUNCH. The FY19 President's Budget supports extension of the F-15C/D's service life by requesting funding for new longerons and new wings. The requested budget provides \$132.6M in APAF to procure 93 sets of longerons and to complete 73 longeron installs through the FYDP. In addition, the requested budget funds \$5.7M in RDT&E to complete wing development and \$103.9M in APAF to procure and install seven sets of wings.

Mr. TURNER. What is the new timeline for the next steps in the source selection process for the T-X? In addition, what is the next funding piece for the T-X?

General BUNCH. The T-X contract award is projected by the end of summer 2018. The FY19 President's Budget requests \$265.5 million for the T-X program.

Mr. TURNER. What is your current plan for A-10 wing upgrades, and is this effort fully funded in fiscal year 2019?

General BUNCH. The A-10 SPO released a request for proposal on May 25, 2018 to procure up to 109 wings. Proposals are expected by the end of August 2018. The Air Force currently has \$79.2M budgeted for wing procurement in FY19.

Mr. TURNER. How is the progress in the research and development of advanced munitions to take full advantage of the Air Force's 5th generation fleet?

General HARRIS. The USAF is engaged in and committed to developing advanced munitions to exploit the full capabilities of 5th gen platforms and their ability to perform in the A2/AD environment. These cooperative systems are essential to accomplishing our part of the National Defense Strategy and are a top priority as we evolve our force and increase lethality. For example, R&D is actively occurring in sensors, propulsion systems and munitions designs to make our next weapons as responsive and survivable as the launch platform. Internal carriage is also considered a top priority and integrated into the earliest USAF decisions to ensure airframe compatibility. This development of complimentary traits will allow our 5th gen fleet to engage future targets with surety of success.

Mr. TURNER. It is our understanding that training opportunities could be limited due to munition inventory shortfalls? Is this true, and if so, what impacts are low inventories of critical munitions having on your overall mission readiness?

General HARRIS. Munitions expenditures in support of enduring combat operations have strained USAF inventories and has limited some training opportunities

for our warfighters. Training opportunities are available and planned for with live air-to-ground and air-to-air munitions, but often not with the most preferred munitions due to their necessity in the current fight. Efforts over the last several years are now yielding increased munitions deliveries and our stockpiles are rapidly improving. These increases will allow for more and better training opportunities where warfighters can have more opportunities to employ live weapons prior to being asked to do so in combat.

**30MM Training Ammo:** The anticipated retirement of the A-10 led to stopping the procurement of 30MM ammo. With the retention of the A-10 until 2030(?), contracts are being restarted, but deliveries of the additional rounds will take time.

**HELLFIRE:** Initial USAF inventories were not sufficient to support the rapid increase in combat ops tempo starting in 2014. The USAF was forced to restrict training opportunities for the preferred HELLFIRE versions in favor of supporting the warfighter. Starting in 2015, a major effort by both the Army and USAF to dramatically increase production along with CENTCOM AOR to husband these critical assets has allowed the USAF inventory to begin to recover. We are looking to start a controlled release of HELLFIRE “R” variants starting with the FY19 training cycle, and will continue to release more assets for training based on inventory condition thru the FY19 training cycle. We anticipate few—if any—training impacts starting with the FY20 training cycle.

**Small Diameter Bomb (SDB):** The rapid increase in ops tempo in CENTCOM, growing concerns to limit collateral damage as well as inventory limits imposed on other low collateral munitions such as HELLFIRE, led to an increased reliance on SDB. We expect to be better able to support SDB training in the FY20 training cycle due to increased USAF purchases mirrored with greatly expanded industry output. Additionally, because of the stand-off range of the weapon, training opportunities are limited due to safety factors and training range capabilities.

**Advanced Precision Kill Weapons System (APKWS):** This is a new system just entering USAF inventory. Since its introduction into the current fight, it has proven an exceptional weapon and the warfighter wants far more than we can procure up to this point. As a new item that went directly to the field, Air Combat Command has not developed a training requirement. We are addressing this at this time and will have training requirements in place to support FY20 training cycle. In the interim, as our inventory posture improves, we plan a measured effort to release APKWS to support training, especially for our aircrew weapons officers.

**Joint Direct Attack Munitions (JDAM):** Increases in JDAM use has taken a toll on USAF inventories. To maintain sufficient stocks, the USAF restricted JDAM use in training, with priority going to support units preparing to rotate into the CENTCOM AOR and especially to those individual aircrews who have never employed JDAM before. We have already been increasing the numbers of JDAMs to support both the FY18 and now the FY19 training cycles as gently increasing deliveries bolster inventories.

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#### QUESTIONS SUBMITTED BY MR. BROWN

Mr. BROWN. I would appreciate your perspective on the importance of the Aircraft Prototype Facility, and particularly, Phase 3 of the facility. I would also like to understand why this Aircraft Prototype Facility is on the DoD's Unfunded Priority List, but not on the Navy's own Unfunded Priority List—in fact it appears the “APF Phase 3” project could be slipping to the right?”

Admiral GROSCLAGS and Admiral CONN. The Aircraft Prototyping Facility, Phase 3 project remains an important requirement to the Navy for supporting naval aviation research and development. Within military construction budget constraints, this project will continue to be evaluated among Navy priorities for a future budget request to Congress.

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#### QUESTIONS SUBMITTED BY MR. BACON

Mr. BACON. For Phase 2 of the OA-X Light Attack Experiment, will each operational test pilot fly and evaluate both the A-29 and the AT-6 to ensure they can directly compare the strengths and characteristics of both aircraft? If not, how will the USAF ensure a fair and objective comparison to ensure we select the best possible aircraft for this mission?

General BUNCH. and General HARRIS. Operational aircrew flew their designated aircraft while Developmental Test aircrew flew both aircraft to assess system performance against a fixed set of threshold requirements. Evaluation criteria to select

the best possible aircraft for the mission will be developed as part of the source selection process.

Mr. BACON. How are AFSOC's Light Attack Support Special Operations (LASSO) mission requirement being folded into the USAF's OA-X experiment? If not, why not?

General BUNCH. and General HARRIS. AFSOC's LASSO effort is being worked in coordination with the overall Light Attack effort. As such, the Light Attack Experiment will inform the LASSO.

Mr. BACON. What is the Air Force's current acquisition strategy for the OA-X aircraft? What are your plans for spending the FY18 \$100M provided by Congress for OA-X? Is additional funding needed and will a reprogramming be necessary to execute your acquisition strategy?

General BUNCH. The Air Force is currently pursuing rapid acquisition fielding authorities under Section 804 of the National Defense Authorization Act of 2016. The FY18 funding is being utilized for the Light Attack effort to include: the actual experiment, Program Office stand up and staffing, and risk reduction activities such as Live Fire testing (planning and execution, parts, equipment, material, and re-test activities). Additional funding is not needed at this time.

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#### QUESTIONS SUBMITTED BY MR. BISHOP

Mr. BISHOP. Recent reports indicate that unless F-35 sustainment costs are brought down by 38%, the AF may need to reduce their purchase by 500+ aircraft. In what ways can the committee help in the upcoming NDAA cycle to improve F-35 sustainment costs, particularly in regards to depot level maintenance?

General BUNCH. The USAF is working toward greater collaboration with the F-35 Joint Program Office and Lockheed Martin to further analyze and control sustainment costs. The USAF is also accelerating depot activation and working to implement other cost reduction initiatives in concert with the Joint Program Office. While we are concerned about current and rising sustainment costs, it is too early for us to make any decision today on reducing the total buy of 1,763.

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#### QUESTIONS SUBMITTED BY MR. BROOKS

Mr. BROOKS. In order to be good stewards of the F-22 assets that the Air Force has said we will continue to fly until the mid 2040s, what is the status of upgrades on the F-22 to counter advancing threats that specifically target the aircraft's capabilities? When can the F-22 operationally expect to see data link capabilities to talk and connect with other aircraft? When can the F-22 operationally expect to carry the AIM-9X Block II?

General BUNCH. The TACLink 16 program will add a Link 16 transmit datalink upgrade, in addition to its existing Intra Flight Data Link capability. TACLink 16 fielding is scheduled to begin 3QFY20. The F-22 Increment 3.2B program, which will provide AIM-9X Block II capability, is on track to begin fielding in the second half of FY19.

Mr. BROOKS. Why has the Air Force decided not to budget for a Helmet Mounted Display for F-22 pilots? Not only does a Helmet Mounted Display provide situational awareness for all aspects of flight, to include safety issues, visual lookout doctrine and instrument scan, it also couples with missile capabilities that yield first shot opportunities in a within visual range engagement.

General BUNCH. For FY19 the Air Force has requested \$1.82M of RDT&E funding to support the F-22 Helmet Mounted Display and Cueing System (HMDCS) effort. As part of the FY19 request, the Air Force included \$12.9M of Procurement funding in FY22 for HMDCS, when it is anticipated the system will begin procurement activities.