

NOT FOR PUBLICATION UNTIL RELEASED BY
THE SENATE ARMED SERVICES COMMITTEE
SEAPOWER SUBCOMMITTEE

STATEMENT OF

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BEFORE THE

SEAPOWER SUBCOMMITTEE

OF THE

SENATE ARMED SERVICES COMMITTEE

ON

DEPARTMENT OF THE NAVY'S AVIATION PROGRAMS

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INTRODUCTION

Mr. Chairman, Senator Hirono, 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) Aviation programs. Our testimony will provide background and rationale for the Department's Fiscal Year 2016 budget request for aviation programs aligning to our strategic priorities and budgetary goals.

The United States is a maritime nation with global responsibilities. Our Navy and Marine Corps' persistent presence and multi-mission capability represent U.S. power projection across the global commons. They move at will across the world's oceans, seas and littorals, and they extend the effects of the sea-base and expeditionary basing deep inland. Naval Aviation provides our nation's leaders with "offshore options" where it matter, when it matters. We enable global reach and access, regardless of changing circumstances, and will continue to be the nation's preeminent option for employing deterrence through global presence, sea control, mission flexibility and when necessary, interdiction. We are an agile strike and amphibious power projection force in readiness, and such agility requires that the aviation arm of our naval strike and expeditionary forces remain strong.

There are several central themes to our 2016 Naval Aviation Budget plan: 5th generation fighter/attack capability; netted persistent multi-role intelligence, surveillance, reconnaissance and targeting; supporting capabilities such as electronic attack, maritime patrol, and vertical lift; advanced strike weapons programs; readiness recovery; and targeted modernization of the force for relevance and sustainability.

First, we are acquiring F-35 5th generation fighter/attack aircraft while maintaining sufficient tactical aviation (TACAIR) inventory capacity. Our plan will integrate 5th generation technologies into the carrier air wing and expeditionary forces while maintaining and modernizing the capability of the current TACAIR fleet. The F-35B and F-35C will replace Marine Corps F/A-18 and AV-8B aircraft significantly increasing

capabilities across the range of military operations of Marine sea and land-based MAGTFs. The F-35C, F/A-18E/F, and EA-18G provide complementary capabilities that enhance the versatility, lethality, survivability, and readiness of our air wings. F/A-18A-F and AV-8B aircraft will continue to receive capability enhancements to sustain their lethality well into the next decade. Future avionics upgrades will enable network-centric operations for integrated fire control, situational awareness and transfer of data to command-and-control nodes.

To meet the demand for persistent, multi-role intelligence, surveillance, and reconnaissance (ISR) capability, the Navy and Marine Corps are building a balanced portfolio of manned and unmanned aircraft focused on missions in the maritime environment. The Unmanned Carrier Launched Airborne Surveillance and Strike (UCLASS) system will provide a persistent aircraft carrier-based ISR&T and strike capability as an integral part of carrier air-wing operations no later than the early part of the next decade. MQ-4C Triton will provide persistent land-based maritime ISR and complement our P-8 Multi-Mission Maritime Aircraft (MMA); MQ-8 Fire Scout will provide ISR support to our Frigates and other suitably-equipped air-capable ships; and smaller unmanned systems such as the RQ-21A Small Tactical Unmanned Aircraft System (STUAS) and RQ-7B Marine Corps Tactical UAS (MCTUAS) will provide the shorter duration, line-of-sight reconnaissance capability integral at the unit level.

The Fiscal Year 2016 Budget request enables Naval Aviation to continue recapitalization of our aging fleets of airborne early warning, maritime patrol, and vertical lift platforms. The Department is recapitalizing our fleet of E-2C airborne early warning aircraft with the E-2D, maritime patrol and reconnaissance with the P-8A, airborne electronic attack with the EA-18G, and Carrier Onboard Delivery (COD) with the V-22. E-2D integrates a new electronically-scanned radar that provides a two-generation leap in technology with the capability to detect and track existing and emerging air-to-air and cruise missile threats in support of Integrated Air and Missile Defense (IAMD). P-8A combines the

proven reliability of the commercial 737 airframe with avionics that enable integration of modern sensors and robust communications. We have deployed our third P-8A squadron and are on a path to replace the P-3C by the end of the decade. Electronic attack capabilities, both carrier-based and expeditionary, continue to mature with the fielding of EA-18G squadrons while we continue development of the Next Generation Jammer (NGJ) to replace the legacy ALQ-99 Tactical Jamming System. Finally, the Department is planning to recapitalize its fleet of C-2A COD aircraft with an extended range variant of the V-22. The decision closes a capacity gap in the COD capability within an existing program of record.

The Navy and Marine Corps are participating in Joint Future Vertical Lift efforts to identify leverage points for future rotorcraft investment. In Fiscal Year 2016 the Department continues to modernize vertical lift capability and capacity with procurement of MH-60R, AH-1Z, UH-1Y, and MV-22B, and the continued development of the CH-53K and VH-92A (Presidential Helicopter replacement). The Special Purpose Marine Air-Ground Task Force-Crisis Response (SPMAGTF-CR), designed to support U.S. and partner security interests throughout the CENTCOM, EUCOM and AFRICOM Areas of Responsibility (AOR), leverages these vertical lift investments. The unparalleled speed and range of the MV-22B, together with the KC-130J and joint tanker assets provides both SPMAGTF-CR with the operational reach to respond to crises throughout any AOR.

Within our Fiscal Year 2016 Budget request the Department continues investment in advanced strike weapons programs. These include Air Intercept Missiles (AIM-9X/BLK II and AIM-120D); Small Diameter Bomb II (SDB II); Tactical Tomahawk Cruise Missiles (TACTOM/BLK IV); the Long-Range Anti-Ship Missile (LRASM); the Advanced Anti-Radiation Guided Missile (AARGM); the Joint Air-to-ground Missile (JAGM); and the Advanced Precision Kill Weapon System (APKWS II).

These capabilities enable our Navy and Marine Corps warfighters to deter and dominate potential adversaries in any environment.

TACTICAL AVIATION

F-35B/F-35C Lightning II:

The F-35 Joint Strike Fighter (JSF) will form the backbone of U.S. air combat superiority for decades to come. Delivering this transformational capability into front line forces as soon as possible remains a top priority. JSF will replace legacy tactical fighter fleets of the Navy and Marine Corps with a dominant, multirole, fifth-generation aircraft, capable of projecting U.S. power and deterring potential adversaries. The Fiscal Year 2016 President's Budget requests \$1.0 billion RDT&E,N and \$3.1 billion APN.

The F-35 program is executing well across the entire spectrum of acquisition, to include development and design, flight test, production, fielding and base stand-up, sustainment of fielded aircraft, and stand up of a global sustainment enterprise. To date, all variants of F-35 have flown close to 28,000 hours close to 11,000 hours for the F-35B and more than 3,000 for the F-35C. Our overall assessment is that steady progress is being made on all aspects of the program. However, F-35 does continue to have its risks, inclusive of software development and integration. However, discipline instilled several years ago in the way software is developed, lab tested, flight tested, measured and controlled has resulted in improved and more predictable outcomes.

The program is in the final stages of flight test for Block 2B software; Block 3i software is anticipated to deliver all planned capabilities; and Block 3F, which has the most software development risk driven by data fusion, is improving. Data fusion enables the aircraft to integrate onboard capabilities with information from multiple other sources, such as non-F-35 aircraft, satellites, and ground stations, to provide the pilot complete and accurate battlespace awareness. This multi-platform fusion is the most complex remaining developmental activity and is being closely monitored. Block 3F complexity

and technical challenges, combined with a delay in the start of 3F flight testing may result in delivery up to 4-6 months late. Overall, the Block 2B configuration, which will support the Marine Corps' F-35B Initial Operational Capability (IOC) will deliver during the Summer of 2015 and is tracking to plan; Block 3i, the same capability as Block 2B but hosted on new and improved computers, is expected to be ready by the end of calendar year 2015, and Block 3F capability will enable Navy to IOC the F-35C variant in 2018 along with the Marine Corps its first F-35C in 2020.

The program has delivered 124 aircraft to test, operational, and training sites, with the production line running approximately two-months behind schedule. Due to government/industry manufacturing management initiatives, production deliveries are improving and the current delays do not pose any long-term schedule or program delivery risks.

Affordability remains a top priority. We have made it clear to the program management team and the F-35 industrial base that the JSF must finish development within the time and money allocated; continue to drive cost out of aircraft production; and reduce life-cycle costs. To that end the program has engaged in a multi-pronged approach to reduce costs across production, operations, and support. The government/industry team is reducing aircraft production costs through "blueprint for affordability" initiatives and reducing F135 engine costs via ongoing engine "war on cost" strategies. These efforts include up-front contractor investment on cost reduction initiatives mutually agreed upon by the government and contractor team. This arrangement motivates the contractors to accrue savings as quickly as possible in order to recoup their investment, and benefits the government by realizing cost savings at the time of contract award. The goal is to reduce the flyaway cost of the U.S. Air Force (USAF) F-35A to between \$80 and \$85 million dollars by 2019, which is anticipated to commensurately decrease the cost to the Marine Corps F-35B and Navy F-35C variants. The program has set a goal of decreasing overall operating and support life-cycle cost by 30 percent.

F/A-18 Overview

The F/A-18 Hornet continues to meet readiness and operational commitments. There are 26 Navy Super Hornet strike fighter squadrons and a total inventory of 521 F/A-18E/Fs; deliveries and squadron transitions will continue through 2018. There are nine Navy and 11 Marine Corps F/A-18 A-D active strike fighter squadrons and a total inventory of 614 Hornets. Super Hornets and F/A-18A-D Hornets have conducted more than 214,000 combat missions since September 11, 2001.

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

The Fiscal Year 2016 President's Budget requests \$371.2 million in APN to implement aircraft commonality programs, maintain relevant capability, improve reliability, and ensure structural safety of the inventory of 614 F/A-18 A-D Hornets. \$148.2 million is for the Service Life Extension Program (SLEP).

The F/A-18A-D was designed for, and has achieved, a service life of 6,000 flight hours. These aircraft have performed as expected through their design life. Service life management of this aircraft is intended to extend this platform beyond its designed 6,000 flight hours. Through detailed analysis, inspections, and structural repairs, as required, the DoN has been successful in achieving 8,000 flight hours for many aircraft and is pursuing a strategy to go as high as 10,000 flight hours on select aircraft. Continued investment in SLEP, the High Flight Hour (HFH) inspection program, Program Related Engineering, and Program Related Logistics is critical for our flight hour extension strategy.

In order to maintain warfighting relevancy in a changing threat environment, we will continue to procure and install advanced systems such as the Joint Helmet-Mounted Cueing System (JHMCS), High Order Language Mission Computers, ALR-67v3, ALQ-214v5, Multifunctional Information Distribution System (MIDS), APG-73 radar

enhancements, Advanced Targeting Forward looking Infrared (ATFLIR) upgrades, and LITENING for the Marine Corps on selected F/A-18A-D aircraft.

F/A-18 E/F Super-Hornet

The F/A-18E/F will be a mainstay of Navy's aviation carrier air wing strike fighter force through 2035. The Fiscal Year 2016 President's Budget requests \$507.1 million in APN to implement aircraft commonality programs, maintain relevant capabilities, improve reliability, and ensure structural safety of the Super-Hornet fleet; and \$153 million RDT&E,N to support the Flight Plan spiral capability development, development of Advanced Electronic Attack and Counter-Electronic Attack, and F/A-18E/F Service Life Assessment Program (SLAP).

The F/A-18E/F significantly improves the survivability and strike capability of the carrier air wing. The Super-Hornet provides increased combat radius and endurance, and a twenty-five percent increase in weapons payload over F/A-18A-D Hornets. The production program continues to deliver on-cost and on-schedule.

The Super-Hornet uses an incremental approach to incorporate new technologies and capabilities, to include Digital Communication System Radio, MIDS - Joint Tactical Radio System, JHMCS, ATFLIR with shared real-time video, Accurate Navigation, Digital Memory Device, Distributed Targeting System, Infrared Search and Track and continued advancement of the APG-79 Active Electronically Scanned Array (AESA) Radar.

\$19.7 million of the 2016 RDT&E,N supports the F/A-18E/F SLAP requirement. The F/A-18 E/F fleet, on average, has flown approximately 36 percent of the design life of 6,000 flight hours. The remaining design service-life will not be adequate to meet long-term operational commitments through 2035. In 2008 the Navy commenced a three phase F/A-18E/F SLAP to analyze actual usage versus structural test results and determine the feasibility of extending F/A-18E/F service life from 6,000 to 9,000 flight

hours via a follow-on SLEP. The F/A-18E/F SLAP will identify the necessary inspections and modifications required to achieve 9,000 flight hours and increase total arrested landings and catapults beyond currently defined life limits. This extension is assessed as low risk. The Service Life Management Plan philosophy has been applied to the F/A-18E/F fleet at an earlier point in its lifecycle than the F/A-18A-D. This will facilitate optimization of Fatigue Life Expended, flight hours, and total landings, thereby better aligning aircraft service life with fleet requirements.

AV-8B Harrier

Since the beginning of the war on terror, the AV-8B Harrier has been a critical part of the strike fighter inventory for the Joint force. This aircraft has flown more than 54,000 hours in combat since 2003 with zero losses from the enemy in the air but six losses on the ground when the enemy broke through our forces at Bastion air base in 2012. The Fiscal Year 2016 President's Budget requests \$83.3 million in APN funds to continue the incorporation of Obsolescence Replacement / Readiness Management Plan systems, electrical and structural changes, inventory sustainment and upgrade efforts to offset obsolescence and attrition, LITENING Pod upgrades, and F402-RR-408 engine safety and operational changes.

The Fiscal Year 2016 President's Budget requests \$39.9 million in RDT&E,N funds to continue Design, Development, Integration and Test of various platform improvements, to include Engine Life Management Program, Escape Systems, Joint Mission Planning System updates, Link 16 Digital Interoperability integration, Operational Flight Program (OFP) block upgrades to various mission and communication systems, navigation equipment, weapons carriage, countermeasures, and the Obsolescence Replacement / Readiness Management Plan.

The AV-8B continues to deploy in support of operational contingencies. Each Marine Expeditionary Unit (MEU) deploys with embarked AV-8Bs. The AV-8B, equipped with

LITENING targeting pods and a video downlink to ROVER ground stations, precision strike weapons, Intrepid Tiger II EW pods and beyond visual range air-to-air radar guided missiles, continues to be a proven, invaluable asset for the Marine Air Ground Task Force (MAGTF) and joint commander across the spectrum of operations. One squadron has flown more than 3,400 hours of strike sorties against ISIS with an average combat radius of 900 miles. Digital Improved Triple Ejector Racks have allowed us to load up to 6 precision guided munitions per aircraft, with tanks, guns, and Litening Pods exponentially increasing the combat viability of this platform. In Fiscal Year 2016 the Airborne Variable Message Format terminals will be installed in AV-8B to replace the current digital-aided close air support (CAS) technology. The program will continue development of the H6.2 Operational Flight Program to integrate Federal Aviation Administration compliant Navigation Performance/Area Navigation (RNP/RNAV) capability, an update to the LITENING Common OFP to implement improvements to moving target tracking, and correct additional software deficiencies identified through combat operations. The program will also work on the H7.0 OFP which will integrate Link 16 functionality. As an out-of-production aircraft, the AV-8B program will continue its focus on sustainment efforts to mitigate significant inventory shortfalls, maintain airframe integrity, achieve full Fatigue Life Expended, and address reliability and obsolescence issues of avionics and subsystems.

Operations ODYSSEY DAWN, ENDURING FREEDOM, and today's Operation FREEDOM SENTINEL confirm the expeditionary advantages of Short Take-Off and Vertical landing (STOVL) capabilities. Placing the Harrier as the closest multi-role fixed-wing asset to the battlefield greatly reduces transit times to the battlefield and enables persistent CAS without strategic tanking assets. Airframe sustainment initiatives, capability upgrades, and obsolescence mitigation is essential and must be funded to ensure the AV-8B remains lethal and relevant.

FA-XX

The Department is preparing to conduct an analysis of alternatives (AoA) to address the anticipated retirement of the F/A-18E/F and EA-18G aircraft beginning in the mid 2020 timeframe. The FA-XX AoA will consider the widest possible range of materiel concepts while balancing capability, cost, schedule, and supportability considerations. It will assess manned, unmanned, and optionally manned approaches to fulfill predicted 2030+ mission requirements. Analysis 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. The Fiscal Year 2016 budget requests \$5.0 million in RDT&E,N to conduct this AoA.

Strike Fighter Inventory Management

The Department remains challenged with end of life planning for F/A-18A-D and AV-8B aircraft that reach the end of their service life before replacement aircraft (F-35B/C) can be fully delivered into service. In the Fiscal Year 2016 budget request the Department was forced to cut 16 F-35Cs from the budget (FY 2016- 2020), delaying the stand-up of the first Marine Corps F-35C squadron by one year and delaying subsequent F-35C squadron transitions by two years each. Strike Fighter Inventory Management risk increases with the Fiscal Year 2016 budget request, further increasing the gap between supply and the Department's Master Aviation Plan demand.

The near term inventory challenge is due to a combination of reduced Strike Fighter procurement, higher than planned TACAIR utilization rates, and F/A-18A-D and AV-8B depot facility production falling short of the 2013 and 2014 required output. Aggressive efforts across the Department were instituted in 2014 to improve depot throughput and return more aircraft back to the Fleet. Aviation depots are expected to improve productivity through 2017, and fully recover the backlog of F/A-18A-D by 2019 and Harrier by 2016; at which time the focus will shift towards F/A-18E/F service life

extension. The Marines ran an Independent Readiness Review of their AV-8B program to recover to a T-2.0 readiness level within their AV-8B fleet, meet their operational requirements and ensure they had an adequate bridge to the F-35. By following the plan, the AV-8B fleet should be in the green in 17 months.

The Navy and USMC strike-fighter force continues to meet their operational commitments. However, we anticipate the inventory pressure to remain relatively constant through Fiscal Year 2016 as we experience peak depot inductions of F/A-18A-D aircraft reaching 8,000 hours and entering extensive High Flight Hour (HFH) service life extension inspections, repairs and modifications.

Airborne Electronic Attack (AEA) / EA-18G Growler

The Fiscal Year 2016 President's Budget request includes \$108.5 million in APN to implement aircraft commonality programs, maintain relevant capabilities, improve reliability, and ensure structural safety of the Growler fleet; \$56.9 million in RDT&E,N for Flight Plan spiral capability development, design and integration of Jamming Techniques Optimization improvements, evolutionary software development and related testing; and \$398.8 million RDT&E,N for NGJ Increment 1 and \$13.0 million RDT&E,N for NGJ Increment 2.

In 2009, the Navy began the transition from EA-6Bs to EA-18Gs. The EA-18G is a critical enabler of the Joint force, bringing fully netted capabilities that provide electromagnetic spectrum dominance in an electromagnetic maneuver warfare environment. The first EA-18G squadron deployed to Iraq in an expeditionary role in November 2010 in support of Operation NEW DAWN, and subsequently redeployed to Italy on short notice in March 2011 in support of Operations ODYSSEY DAWN and UNIFIED PROTECTOR. The first carrier-based EA-18G squadron deployed in May 2011. Three active component Navy expeditionary squadrons, nine of ten carrier based squadrons, and one reserve squadron have completed, or are in, transition to the EA-18G.

The 10 carrier based EA-18G squadrons will fulfill Navy requirements for airborne electronic attack; six expeditionary EA-18G squadrons will provide the joint, high-intensity AEA capability required by the Joint Forces Commander, which was previously fulfilled by the Navy and Marine Corps EA-6B. The Navy will be divested of EA-6Bs by 2015; the Marine Corps by 2019 leaving the E/A-18G as the only viable AEA platform in the DoD inventory. The inventory objective is 153 EA-18G aircraft. Since their initial deployment, Growlers have flown more than 2,300 combat missions, have expended approximately six percent of the 7,500 flight hour life per aircraft, and are meeting all operational commitments.

Next Generation Jammer (NGJ)

NGJ is a new electronic warfare capability that will replace the 42-year old ALQ-99, currently the only Navy and Joint airborne Tactical Jamming System pod. The ALQ-99 has limited capability to counter tactically and technically advanced threats, is increasingly difficult and costly to maintain, and has a vanishing industrial supplier base. The Navy and Department of Defense (DoD) require NGJ to meet current and emerging EW threats. NGJ will have the necessary power and digital techniques to counter increasingly advanced and sophisticated adversary electronic warfare search, surveillance, and targeting-radars and communications systems. NGJ will be DoD's only comprehensive tactical AEA capability - supporting all Services and joint/coalition partners, and will be implemented in three increments: Mid-Band (Increment 1), Low-Band (Increment 2), and High-Band (Increment 3). NGJ is designed to provide improved capability in support of joint and coalition air, land, and sea tactical strike missions and is critical to the Navy's vision for the future of strike warfare. Fiscal Year 2016 funding is vital to maintain schedule, allowing the program to complete Technology Maturation and Risk Reduction (TMRR) and transition into the Engineering and Management Development (EMD) phase. Initial concept studies and formal program stand-up will begin in Fiscal Year 2016 for Increment 2.

Airborne Electronic Attack (AEA) / EA-6B Prowler

The Fiscal Year 2016 President's Budget request includes \$15.5 million in RDT&E,N for Electronic Warfare (EW) Counter Response, \$2.8 million RDT&E,N for MAGTF EW, \$23.2 million in APN for Airborne Electronic Attack (AEA) systems, \$9.8 million in APN for all EA-6B series aircraft, and \$7.7 million APN for MAGTF EW.

Currently, there are 37 EA-6Bs in the Navy and Marine Corps, which are distributed to three Marine Corps and one Navy operational squadron, one Navy flight test squadron, and one Marine Corps training squadron. The total includes five Navy ICAP II aircraft and 32 ICAP III aircraft. All ICAP III EA-6Bs are operated by the Marine Corps. Final retirement of the EA-6B from the DoN inventory will be in 2019.

Marine aviation is on a path toward a distributed AEA 'system of systems' that is a critical element in achieving the MAGTF EW vision: A composite of manned and unmanned surface, air, and space assets on a fully collaborative network providing the MAGTF commander control of the electromagnetic spectrum when and where desired. Included in this plan are the ALQ-231 Intrepid Tiger II communications jammer, UAS EW payloads, a Software Reprogrammable Payload and an EW Services Architecture to facilitate collaborative networked EW Battle Management.

Intrepid Tiger II development and procurement is in response to Marine Corps requirements for increased precision EW capability and capacity across the MAGTF and provides EW capability directly to tactical commanders without reliance upon the limited availability of the low density/high demand EA-6B Prowler. Intrepid Tiger II is currently carried on AV-8B and F/A-18 A++/C/D aircraft, has successfully completed nine deployments, and is currently deployed with both the 11th and 24th MEUs. Integration on Marine Corps rotary-wing aircraft is scheduled to be completed by the fourth quarter of Fiscal Year 2015. Development of an Intrepid Tiger II counter-radar capability for the penetrating jammer mission will begin in Fiscal Year 2016.

E-2D Advanced Hawkeye (AHE)

The Fiscal Year 2016 President's Budget requests \$272.1 million in RDT&E,N for continuation of added capabilities, to include In-Flight Air Refueling, Tactical Targeting Network Technology (TTNT), Secret Internet Protocol Router chat, Advanced Mid-Term Interoperability Improvement Program, Multifunctional Information Distribution System/Joint Tactical Radio System TTNT, Counter Electronic Attack, Sensor Netting, and Data Fusion. In the third year of a 26 aircraft Multi-Year Procurement (MYP) contract covering Fiscal Years 2014-2018, the budget requests \$1,053 million in APN for five Full Rate Production (FRP) Lot 4 aircraft , Advance Procurement (AP) for Fiscal Year 2017 FRP Lot 5 aircraft; and Economic Ordering Quantity funding for the MYP for Fiscal Year 2018.

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 capable of synthesizing information from multiple onboard and off-board sensors, making complex tactical decisions and then disseminating actionable information to Joint Forces in a distributed, open-architecture environment. E-2D is also a cornerstone of the Naval Integrated Fire Control – Counter Air (NIFCA-CA) capability.

Utilizing the newly developed AN/APY-9 Mechanical/Electronic Scan Array radar and the Cooperative Engagement Capability (CEC) system, the E-2D AHE works in concert with tactical aircraft and surface-combatants equipped with the Aegis combat system to detect, track and defeat air and cruise missile threats at extended ranges.

The first Fleet E-2D squadron (VAW-125) was designated "safe for flight" in January 2014. IOC was achieved in October 2014.

ASSAULT SUPPORT AIRCRAFT

MV-22

The Fiscal Year 2016 President's Budget requests \$87.9 million in RDT&E,N for continued product improvements, including engineering development of a Navy variant of the MV-22; and \$1.48 billion in APN for procurement and delivery of 19 MV-22s (Lot 20). Fiscal Year 2016 will be the fourth year of the 2nd V-22 MYP contract covering Fiscal Years 2013-2017. The funds requested in the Fiscal Year 2016 President's Budget fully fund Lot 20 and procure long-lead items for Fiscal Year 2017 Lot 21 MV-22 aircraft. The APN request includes \$126.1 million to support Operations and Safety Improvement Programs (OSIPs), including Correction of Deficiencies and readiness improvements. The Fiscal Year 2016 request includes funding starting in Fiscal Year 2018 to procure a Navy variant in support of the Carrier Onboard Delivery mission.

MV-22 Osprey vertical flight capabilities, coupled with the speed, range, endurance of fixed-wing transports, are enabling effective execution of current missions that were previously unachievable. In 2014, a second Marine Corps SPMAGTF-CR was stood up in CENTCOM and the twelfth and final MV-22 for HMX-1 "Greenside" logistics and passenger transport was delivered for support of the Presidential transport mission. As the V-22 fleet approaches the 300,000 flight hour milestone it has proven to be the safest Marine Corps rotorcraft.

The second MYP, which began in Fiscal Year 2013, will procure at least 93 MV-22s over five years and results in savings of approximately \$1 billion when compared to single year procurements. The stability of the MYP supports the Marine Corps' retirement of legacy aircraft, benefits the supplier base and facilitates cost reductions on the part of both the prime contractor and sub-tier suppliers.

Due to extremely high demand for MV-22 capability from the Combatant Commanders, and a resultant high operational tempo in 2014, the mission capability rates leveled-off

and did not continue the year over year improvements seen since 2010. This was primarily due to our inability to train enlisted maintainers in the numbers and qualifications standard we need to sustain such a high demand signal. Right now we have 13 Full Operational Capability squadrons, with two in build, and are executing to an overall 15 squadron demand signal. We are shifting resources and modifying standup, transition, and training plans, but the demand for the capabilities this aircraft brings to the COCOMs is creating growing pains. While we are confident these issues will be overcome, there has been an impact on our readiness rates. Despite a readiness rate decrement, the cost per flight hour has continued to decrease, with a total reduction of nearly 28 percent since 2010. Fiscal Year 2016 OSIP provides a necessary and stable source of crucial modification funding as the Ospreys work to improve readiness and continue to reduce operating cost.

Concurrent with our readiness and support initiatives, we are adding capabilities to the MV-22 that will make it even more valuable to the COCOMs. First, we are expanding the number of aerial refueling platforms that can refuel an MV-22, increasing the range of available options to capitalize on its long-range capabilities. We are also developing a mission kit to allow the MV-22 to deliver fuel to other airborne platforms. We see this as a critical enabler for both shore and sea-based operations. We plan to deliver this capability by the Summer of 2017 concurrent with the first Western Pacific deployment of the F-35B. We are also looking at options that will enable the delivery of precision-guided munitions from the MV-22, which will enhance its ability to operate autonomously and increase the lethality of our force. Finally, an important capability that is a priority for entire aviation force is Digital Interoperability (DI). We are testing and deploying the initial configuration of an onboard suite of electronics that will allow the embarked troop commander to possess unprecedented situational awareness via real time transmission of full motion video and other data generated by multiple air and ground platforms throughout the battlespace. This DI suite will also be able to collect, in real-time, threat data gathered by existing aircraft survivability equipment and off board data

to accompanying attack platforms, thereby shortening the kill chain against ground and air based threats.

In ongoing operations in the Middle East, the MV-22 has become the Tactical Recovery of Aircraft and Personnel (TRAP) platform of choice to rescue downed aircrew in hostile territory. Currently, Marines are on alert in Central Command to recover American and Coalition aircrew executing strike operations. The speed, range, and aerial refueling capability have allowed the Osprey's to remain in strategic locations throughout the area poised for rescue operations. With an unrefueled mission radius of 423 nautical miles, the Osprey can reach greater distances around the battlefield to increase the likelihood of recovering isolated personnel as the speed and altitude envelopes provide better survivability for the TRAP force and recovered aircrew.

CH-53K Heavy Lift Replacement Program

The Fiscal Year 2016 President's Budget requests \$632.1 million RDT&E,N to continue the EMD phase of the CH-53K program. Since entering into developmental test in December 2013 the Ground Test Vehicle (GTV) has completed bare head light-off and shakedown light-off has commenced. Over the last year, the GTV has accumulated over 180 test hours. The first flight vehicle, Engineering Development Model (EDM) 1, has completed its bare head light-off and initial bladed ground runs. The program is currently on schedule to execute its first flight by the end of 2015. During Fiscal Year 2016, the program will continue to execute developmental test flights, deliver the final EDM, and continue assembly of System Demonstration Test Article aircraft, which will be production representative aircraft utilized for Operational Test.

The CH-53K will provide land and sea based heavy-lift capabilities not resident in any of today's platforms and contribute directly to the increased agility, lethality, and presence of joint task forces and MAGTFs. The CH-53K will transport 27,000 pounds of external cargo out to a range of 110 nautical miles, nearly tripling the CH-53E's lift capability

under similar environmental conditions, while fitting into the same shipboard footprint. The CH-53K will also provide unparalleled lift capability under high-altitude and hot weather conditions, greatly expanding the commander's operational reach.

Compared to the CH-53E, maintenance and reliability enhancements of the CH-53K will improve aircraft availability and ensure cost effective operations. Additionally, survivability and force protection enhancements will dramatically increase protection for both aircrew and passengers. Expeditionary heavy-lift capabilities will continue to be critical to successful land and sea-based operations in future anti-access, area-denial environments, enabling sea-basing and the joint operating concepts of force application and focused logistics.

Over the past 13 years, the CH-53 community accumulated over 95,000 combat flight hours. During this period, we suffered ten aircraft losses, nine in combat and one in training. As our CH-53E community approaches 30-years of service, these sustained and unprecedented operational demands have prematurely aged our heavy lift assault support aircraft, making it ever more challenging to maintain and underscoring the importance of its replacement, the CH-53K King Stallion. To keep the H-53E viable until the King Stallion enters service, the Fiscal Year 2016 President's Budget requests \$46.9 million in APN for both near and mid-term enhancements. For both the USN MH-53E and USMC CH-53E helicopters these modifications include Condition Based Maintenance software upgrades, Kapton wiring replacement installations, and improved Engine Nacelles. The Fiscal Year 2016 budget request includes non-recurring engineering for upgrades to the MH-53E's antiquated cockpit. These critical safety and avionics upgrades will address obsolescence issues within the cockpit and increase overall situational awareness and mission effectiveness by improving minefield navigation displays, adding Area Navigation (RNAV) capability, and providing moving map and hover displays. Additionally, non-recurring engineering and kit procurements for the Embedded Global Positioning System/Inertial Navigation System (EGI) will allow the MH-53E to utilize

the full capability of the APX-123 transponder. The Marine Corps' CH-53E fleet is continuing with the T-64 Engine Reliability Improvement Program, Critical Survivability Upgrade (CSU), Satellite Communications (SATCOM) kit installations, and Smart Multi-Function Color Display (SMFCD) procurements and installations.

ATTACK AND UTILITY AIRCRAFT

UH-1Y // AH-1Z

Marine Corps Cobra and Huey attack and utility aircraft have been critical for the success of the Marines in harm's way and over the past 10 years, these aircraft have flown over 196,000 hours in combat. The Fiscal Year 2016 President's Budget requests \$27.2 million in RDT&E,N for continued product improvements; and \$856.2 million in APN for 28 H-1 upgrade aircraft: 12 UH-1Y and 16 AH-1Z. The program is a key modernization effort designed to resolve existing safety deficiencies and enhance operational effectiveness of the H-1 fleet. The 85 percent commonality between the UH-1Y and AH-1Z will significantly reduce life-cycle costs and the logistical footprint, while increasing the maintainability and deployability of both aircraft. The program will provide the Marine Corps with 349 H-1 aircraft through a combination of new production and a limited quantity of remanufactured aircraft.

The H-1 Upgrades Program is replacing the Marine Corps' UH-1N and AH-1W helicopters with state-of-the-art UH-1Y "Yankee" and AH-1Z "Zulu" aircraft. The new aircraft are fielded with integrated glass cockpits, world-class sensors, and advanced helmet-mounted sight and display systems. The future growth plan includes a digitally-aided, close air support system designed to integrate these airframes, sensors, and weapons systems together with ground combat forces and other capable DoD aircraft. Integration of low-cost weapons such as the Advanced Precision Kill Weapon System II provides increased lethality while reducing collateral damage.

The UH-1Y aircraft achieved IOC in August 2008 and FRP in September 2008. The “Yankee Forward” procurement strategy prioritized UH-1Y production in order to replace the under-powered UH-1N fleet as quickly as possible. The last UH-1N was retired from service as of December 2014. The AH-1Z program received approval for FRP in November 2010 and achieved IOC in February 2011. As of February 2015, 148 aircraft (109 UH-1Ys and 39 AH-1Zs) have been delivered to the Fleet Marine Force. An additional 60 aircraft are on contract and in production. Lot 1-7 aircraft deliveries are complete for both the UH-1Y and AH-1Z. Lot 8 and 9 deliveries are complete for the UH-1Y, and Lot 10 UH-1Y deliveries are in progress and ahead of schedule.

The H-1 program is in the process of integrating both the UH-1Y and AH-1Z into the larger digitally interoperable programs of the Marine Corps. With the integration of Intrepid Tiger II, the HMLA community will now be able to provide the MAGTF Commanders with all six essential functions of Marine Air. Additionally, these aircraft will incorporate Software Reprogrammable Payload (SRP) to utilize diverse networks and waveforms thus allowing maneuverability within the spectrum. SRP will employ systems as Link-16, Tactical Targeting Network Technology, Adaptive Networking Wideband Waveform, and the Soldier Radio Waveform.

MH-60 (Overview)

MH-60 Seahawks have consistently met readiness and operational commitments. There will be 38 Navy Seahawk squadrons with 275 MH-60S and 280 MH-60R aircraft when transitions from the SH-60B, SH-60F, and HH-60H are complete. Production and squadron transitions will continue through 2017. Over the last twelve years of combat operations, deployed ashore and aboard our aircraft carriers, amphibious ships, and surface combatants at sea, Navy H-60 helicopters have provided vital over-watch and direct support to troops in combat across multiple theaters of operation and variety of missions; including support to special operations forces, air ambulance, surface warfare,

anti-submarine warfare, mine warfare, logistics support and humanitarian assistance/disaster relief.

MH-60R Seahawk

The Fiscal Year 2016 President's Budget requests \$970 million in APN for 29 helicopters. The production program continues to deliver on-cost and on-schedule.

The MH-60R Multi-Mission Helicopter provides strike group protection and adds significant capability in its primary mission areas of Undersea Warfare and Surface Warfare; the latter including Fast Attack Craft/Fast In-shore Attack Craft (FAC/FIAC) threat response capabilities. The MH-60R is the sole organic air Anti-Submarine Warfare (ASW) asset in the Carrier Strike group (CSG) and serves as a key contributor to theater level ASW. The MH-60R also employs advanced sensors and communications to provide real-time battlespace management with a significant, active or passive, over-the-horizon targeting capability. Secondary mission areas include Search and Rescue, Vertical Replenishment, Naval Surface Fire Support, Logistics Support, Personnel Transport and Medical Evacuation.

The \$21.4 million RDT&E,N request supports the MH-60R Test Program, consisting of numerous system upgrades and Pre-Planned Product Improvements, to include the Digital Rocket Launcher (DRL) with APKWS II, Helicopter Infra-Red Suppression System, Multifunctional Information Distribution System - Low Volume Terminal (LVT) Block Upgrade 2, and the VHF Omnidirectional Ranging/Instrument Landing System.

MH-60S Seahawk

The Fiscal Year 2016 President's Budget requests \$28 million in APN for annualized support of the final deliveries of aircraft, trainers, ground support equipment, and publications required to complete the production program of 275 helicopters. The production program continues to deliver on-cost and on-schedule. The MH-60S Multi-

Mission Helicopter provides strike group protection and adds significant capability in its primary mission areas of Mine Warfare and Surface Warfare. Secondary mission areas include Combat Search and Rescue, Support to Special Operations Forces, Vertical Replenishment, Logistics Support, Personnel Transport and Medical Evacuation.

The \$5.2 million RDT&E,N request supports the MH-60S Test Program, consisting of system upgrades for Airborne Mine Countermeasures (AMCM), Armed Helicopter FAC/FIAC Defense, and the commencement of a service life assessment program.

Armed Helo Block 3A Operational Test (OT) was completed in June 2007 and Block 3B (added Link 16 capability) OT was completed in November 2009. Test and Evaluation (T&E) of fixed forward firing weapon (FFW) (20mm gun system) was completed in Fiscal Year 2012. T&E of initial FFW Unguided Rocket (UGR) capability was completed in Fiscal Year 2013. T&E for Digital Rocket Launcher APKWS II and expanded UGR capability for the FAC/FIAC threat is in work and planned to complete in Fiscal Year 2016. Planned Airborne MCM Initial Operational Test and Evaluation (IOT&E) and Follow-On Operational Test and Evaluation (FOT&E) periods were changed to Operational Assessments, with the final IOT&E aligned with LCS Mine Counter Measures Mission Package IOT&E.

EXECUTIVE SUPPORT AIRCRAFT

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

The VH-3D and VH-60N are safely performing the Executive Lift mission worldwide. As these aircraft continue to provide seamless vertical lift for the President of the United States, the DoN is working closely with HMX-1 and industry to sustain these aircraft until a Presidential Helicopter Replacement platform is fielded. The Fiscal Year 2016 President's Budget requests an investment of \$76.1 million of APN to continue programs that will ensure the in-service Presidential fleet remains a safe and reliable platform.

Ongoing VH-60N efforts include the Cockpit Upgrade Program, engine upgrade program, and a Communications Suite Upgrade (Wide Band Line of Sight) that provides survivable access to the strategic communications network. The continuing Structural Enhancement Program and the Obsolescence Management Program applies to both VH-60N and VH-3D. The program has significantly reduced the cost and schedule of the VH-3D Cockpit Upgrade Program by focusing on critical obsolescence issues. These technology updates for legacy platforms will be directly leveraged for the benefit of the ensuing replacement program (VH-92A).

VH-92A Presidential Helicopter Replacement Aircraft

The Fiscal Year 2016 President's Budget request includes \$507.1 million of RDT&E,N to fund the VH-92 EMD contract and associated government activities. Significant progress has been made in the past year with completion of the Milestone B Review in March, receipt of the Acquisition Decision Memorandum in April, award of the EMD contract to Sikorsky Aircraft Corporation in May, completion of the System Requirements Review in August and completion of the Integrated Baseline Review in November. The Sikorsky S-92A aircraft will be used to execute the acquisition strategy of integrating mature subsystems into an air vehicle that is currently in production. Initial contractor testing on an S-92A aircraft is planned for 2015 and early 2016, and the critical Design Review is planned for the 4th quarter of Fiscal Year 2016. The first of the planned operational inventory of 21 aircraft could begin fielding as early as 2020.

FIXED-WING AIRCRAFT

KC-130J

The DoN plans to procure two KC-130Js and continue product improvements. Targeted improvements include aircraft survivability through advanced electronic countermeasure modernization and obsolescence upgrades to the Harvest HAWK ISR/Weapon Mission Kit.

Fielded throughout our active force, the KC-130J brings increased capability, performance and survivability with lower operating and sustainment costs to the MAGTF. Forward deployed in support of ongoing operations since 2005, the KC-130J continues to deliver Marines, fuel and cargo whenever and wherever needed. In 2015 the KC-130J remains in high demand, providing tactical air-to-air refueling, assault support, Close Air Support (CAS) and Multi-sensor Imagery Reconnaissance (MIR) capabilities, in support of Special Purpose MAGTFs and deployed MEUs.

First deployed in 2010, the roll-on/roll-off Harvest HAWK mission kit for the KC-130J continues to provide extended MIR and CAS capabilities. With almost 7,000 hours flown, over 200 Hellfire missile and 90 Griffin munition combat engagements, this expeditionary mission kit has proven its worth and made the KC-130J even more indispensable for Marines on the ground. All six mission kits have been fielded, and funding included in the FY 2016 budget request will be used to maintain operational relevance of this mission system through compatibility with additional Hellfire variants and an improved full motion video data-link.

The Marine Corps has funded 53 of the 79 KC-130J aircraft in the program of record. The three aircraft included in the Fiscal Year 2013 budget would complete the Active Component (AC) requirement of 51 aircraft. However, the Marine Corps began using the AC backup aircraft to accelerate the Reserve Component (RC) transition from the legacy KC-130T aircraft to the more capable and efficient KC-130J in FY 2014. The aircraft requested in the FY 2016 President's Budget will continue to increase KC-130J inventory as we strive to achieve Full Operational Capability in the RC. Delays in procurement would force the Marine Corps to sustain the KC-130T aircraft longer than planned at an increased cost.

It is also important to note that the US Air Force C-130J procurement is expected to end in 2022. If the Marine Corps procures KC-130Js at a rate of two per year from Fiscal Year 2016-2022, we will have approximately 12 aircraft remaining to procure in order to reach the Program of Record (POR) of 79 aircraft. This POR is expected to complete in 2029. After the USAF completes its C-130J procurement, NAVAIR will no longer be able to leverage USAF contracting services. Given the loss of USAF contracting services and the uncertainty of additional Foreign Military Sales, the Navy and Coast Guard customers potentially could have a significant unit cost increase.

MARITIME SUPPORT AIRCRAFT

P-8A Poseidon

The P-8A Poseidon recapitalizes the Maritime Patrol ASW, Anti-Surface Warfare (ASuW) and armed ISR capability currently resident in the P-3C Orion. The P-8A combines the proven reliability of the commercial 737 airframe with avionics that enables integration of modern sensors and robust communications. The P-8A's first operational deployment was completed in June 2014, and continuous 7th Fleet operational deployments are underway. As of February 2015, four Fleet squadrons have completed transition to P-8A. All Fleet squadrons are scheduled to complete transition by the end of FY 2019. The P-8A program is meeting all cost, schedule and performance parameters in accordance with the approved Acquisition Program Baseline.

Boeing has delivered 21 aircraft (Low Rate Initial Production (LRIP) I/II/III) to the Fleet as of February 2015, and three remaining LRIP III aircraft are scheduled to deliver by May 2015. LRIP IV (13 aircraft), and FRP 1 (16 aircraft) are under contract and will start delivering in May 2015. FRP 2 (nine aircraft) is planned to award in June 2015. The FY 2016 President's budget procures 47 P-8As over the FYDP and sustains the P-3C to P-8A transition. In Fiscal Year 2016 the warfighting requirement remains 117 aircraft;

however, the fiscally constrained inventory objective for 109 aircraft will provide adequate capacity at acceptable levels of risk.

As fleet deliveries of the Increment 1 configuration accelerate, integration and testing of P-8A Increment 2 capability upgrades continues. P-8A Increment 2 Engineering Change Proposal (ECP) 1 “Early Multi-Static Active Coherent (MAC)” FOT&E commenced November 15, 2014. The Navy is on track to field the ECP 1 “Early MAC” capability in Fiscal Year 2015 followed by Increment 2 ECP 2 “Full MAC” capabilities in Fiscal Year 2016. The Increment 2 ECP 3 contract for High Altitude ASW Weapons Capability capabilities was awarded in December 2014.

P-3C Orion

The aging P-3 fleet will continue to provide critical ASW, ASuW and ISR support for joint and naval operations worldwide until the Fleet completes transition to P-8A. The Fiscal Year 2016 budget request provides \$3.1 million in funding required to manage P-3C aircraft mission systems obsolescence during the transition. As of December 2014, 61 P-3 Special Structural Inspection-Kits have been installed (zero remaining); 87 Zone 5 modifications completed (last three aircraft in work); and 20 Outer Wing Installations completed (last nine aircraft in work).

The P-3 aircraft is well beyond the original planned fatigue life of 7,500 hours for critical components, with an average airframe usage of over 18,400 hours. The Fiscal Year 2016 request continues to fund the P-3 Fatigue Life Management Program so the Navy can maintain sufficient capacity to successfully complete the transition to P-8A.

EP-3 Aries Replacement/Sustainment

The EP-3E Aries is the Navy's premier manned Maritime Intelligence, Surveillance, Reconnaissance, and Targeting (MISR&T) platform. The Joint Airborne Signals intelligence (SIGINT) Common Configuration includes Multi-Intelligence sensors, robust

communication, and data links employed by the flexible and dependable P-3 air vehicle to ensure effective MISR&T support across the full Range of Military Operations. The Fiscal Year 2011 National Defense Authorization Act directed Navy to sustain EP-3E airframe and mission systems relevance to minimize SIGINT capability gaps until the systems are fully recapitalized with a platform or family of platforms that in the aggregate provide equal or better capability and capacity. The Fiscal Year 2016 request maintains the retirement dates from the previous year that were extended by one year to Fiscal Year 2019 and Fiscal Year 2020, respectively.

Navy ISR family of systems approach shifts focus from platforms to payloads. The future force will rapidly respond to changing threats with modular, scalable, netted sensors and payloads on a range of sea and shore-based manned and unmanned systems, establishing persistent Maritime ISR when and where it is needed.

Navy's ISR&T transition plan will deliver increased capacity and persistence by the end of the decade. However, due to fiscal and end strength constraints, the Department will accept some risk in near term capability and capacity. The Fiscal Year 2016 budget request reduces risk compared to the previous fiscal year and the Navy continues to work with Joint Staff, DoD, and the Fleet to optimize the ISR transition plan. The transition plan remains largely unchanged from Fiscal Year 2015.

AIRLIFT/CARGO UTILITY AIRCRAFT

COD Recapitalization (Navy V-22 Variant)

The C-2A fleet, which provides long-range logistical support to carrier strike groups, will reach the end of its service life in the mid-2020s with continued sustainment investment. The Navy is planning to recapitalize the COD capability with an extended range variant of the V-22. Fiscal Year 2016 investments support an affordable COD recapitalization

plan that procures a version of the V-22 Osprey under the existing Program of Record (POR).

The Navy's variant of V-22 has been a component of the POR since program inception. This transition strategy allows the Navy to recapitalize the aging C-2 COD capability in an affordable manner and evolve the Aerial Logistics Concept of Operations from the CVN centric "Hub and Spoke" model to a flexible Sea Base support concept.

UNMANNED AIRCRAFT SYSTEMS (UAS)

MQ-4C Triton UAS

The Fiscal Year 2016 President's Budget enables MQ-4C Triton entry into production with three LRIP aircraft in Fiscal Year 2016.

The Fiscal Year 2016 President's Budget requests \$227.2 million in RDT&E,N to continue Triton development activities, \$150.9 million in RDT&E for Triton modernization, and \$548.8 million of APN for procurement of the first lot of LRIP aircraft and for procurement of long lead materials for the second lot of LRIP aircraft.

Triton will start establishing five globally-distributed, persistent maritime ISR orbits beginning in Fiscal Year 2018, as part of the Navy's Maritime ISR&T transition plan. MQ-4C Triton test vehicles have completed 21 total flights as of February 2015 and are on schedule to begin sensor integration testing this spring. This rigorous integrated flight test program will support Milestone C planned for Fiscal Year 2016. The MQ-4C Triton is a key component of the Navy Maritime Patrol Reconnaissance Force. Its persistent sensor dwell, combined with networked sensors, will enable it to effectively meet ISR requirements in support of the Navy Maritime Strategy.

The Navy currently maintains an inventory of four USAF Global Hawk Block 10 UAS, as part of the BAMS Demonstrators, or BAMS-D program. These aircraft have been

deployed to CENTCOM's AOR for over six years. BAMS-D recently achieved over 14,000 flight hours in support of CENTCOM ISR tasking. These assets are adequate to cover all Navy needs through Fiscal Year 2018.

Unmanned Combat Air System Demonstration (UCAS-D)

The Fiscal Year 2016 President's Budget requests no funding for the UCAS-D program. The UCAS-D program is in its final year of funding (\$35.9M in RDT&E,N for Fiscal Year 2015). With the completion of the Autonomous Aerial Refueling test flights this spring, the demonstration will come to a successful close. The X-47B has met demonstration objectives and reduced technical risk by transferring lessons learned to the UCLASS program. The X-47B demonstrators have paved the way for the proficient introduction of a sea-based unmanned aircraft system by digitizing the carrier controlled environment, achieving precision landing navigation performance, demonstrating a deck handling solution, and refining the concept of operations.

Unmanned Carrier Launched Airborne Surveillance and Strike (UCLASS) System

The UCLASS system will provide the Carrier Strike Group (CSG) with a persistent unmanned ISR&T and precision strike capability that is available organically to the CSG and comprehensively to the Joint force. The CSG is often the first responder for the nation. The UCLASS system will enhance the CSG's capability and versatility and enable sustained 24/7 operations from a single aircraft carrier. The Fiscal Year 2016 President's Budget requests \$134.7 million in RDT&E,N for UCLASS system development efforts. This funding will continue progress on the Control System & Connectivity, Carrier Segments and the government Lead System Integrator efforts, while the Department conducts a Strategic Portfolio Review of ISR&T systems and the future composition of the carrier air wing.

The UCLASS system will be integrated with carrier air wing operations, increasing the effectiveness of current CSG ISR&T capabilities (airborne, surface, and sub-surface) beginning in the Fiscal Year 2022 timeframe. Once deployed, the UCLASS System will inherently provide reach-back to Navy and National architectures for command and control and for tasking, processing, exploitation, and dissemination. The UCLASS system will achieve these capabilities through the development and integration of a carrier-suitable, semi-autonomous, unmanned Air System; a Control System and Connectivity Segment; and NIMITZ/FORD class Carriers. The development and integration effort is overseen by the Government as the Lead Systems Integrator, providing system-of-systems integration for the UCLASS Program.

MQ-8 Vertical Takeoff and Landing Unmanned Aerial Vehicle (VTUAV) Fire Scout

The MQ-8 Fire Scout is an autonomous system designed to operate from any suitably-equipped air-capable ship, carry modular mission payloads, and operate using the Tactical Control System and Line-Of-Sight Tactical Common Data Link. The Fiscal Year 2016 President's Budget requests \$52.8 million of RDT&E,N to continue development of the MQ-8C endurance upgrade, to include integration of ISR payloads, radar and short range air to surface weapons. Funding will also be used to continue payload and Frigate integration with the MQ-8B and MQ-8C. The request for \$142.5 million in APN procures MQ-8C air vehicles; MQ-8 System mission control systems; ancillary, trainers and support equipment; technical support; modifications based on engineering changes; and logistics products and support to outfit suitably-equipped air-capable ships and train the associated Aviation Detachments. Commonality of avionics, software, and payloads between the MQ-8B and MQ-8C has been maximized. The MQ-8B and MQ-8C air vehicles will utilize the same ship-based mission control system and other ship ancillary equipment.

Fire Scout was deployed to Afghanistan from May 2011 until August 2013, and amassed more than 5,100 dedicated ISR flight hours in support of U.S. and coalition forces. Since

2012, the MQ-8B Fire Scout has flown more than 7,500 hours from Navy Frigates, performing hundreds of autonomous ship board take-offs and landings in support of Special Operations Forces and Navy operations. The MQ-8C Fire Scout continues developmental test and has completed phase II dynamic interface testing aboard the Navy destroyer USS JASON DUNHAM. The MQ-8C has flown more than 400 flight hours since October of 2013. The Fire Scout program will continue to support integration and testing for LCS-based mission modules.

Tactical Control System (TCS)

The Fiscal Year 2016 President's Budget requested \$8.6 million in RDT&E,N for the MQ-8 System's Tactical Control System (TCS). TCS provides a standards-compliant open architecture with scalable command and control capabilities for the MQ-8 Fire Scout system. In Fiscal Year 2016 TCS will continue to transition the Linux operating system to a technology refreshed mission control system, and enhance the MQ-8 System's Automatic Identification System and sensor track generation integration with ship systems. The Linux operating system conversion overcomes hardware obsolescence issues with the Solaris based control stations and provides lower cost software updates using DoD common application software. In addition, the TCS Linux upgrade will enhance collaboration with the Navy's future UAS Common Control System.

Small Tactical Unmanned Aircraft System (STUAS) RQ-21A Blackjack

The Fiscal Year 2016 President's Budget requests \$11.1 million in RDT&E (\$4.7 million USN, \$6.4 million USMC); \$55.0 million in APN for three Navy systems to support Naval Special Warfare; and \$84.9 million in PMC for four RQ-21A systems (which includes 20 air vehicles) to address Marine Corps ISR capability requirements currently supported by service contracts. This Group 3 UAS will provide persistent ship and land-based ISR support for expeditionary tactical-level maneuver decisions and unit level force defense and force protection missions. Blackjack entered LRIP in 2013, completed

IOT&E in the second quarter of Fiscal Year 2015, with Full Rate Production planned for the first quarter of Fiscal Year 2016.

The RQ-21's current configuration includes full motion video, communications relay package and automatic identification systems. The air vehicle's payload bay allows for rapid deployment of signal intelligence payloads. The Marine Corps is actively pursuing technological developments for the RQ-21 system in an effort to provide the MAGTF and Marine Corps Forces Special Operations Command with significantly improved capabilities. Initiatives include over-the-horizon communication and data relay ability to integrate the system into future networked digital environments; electronic warfare and cyber payloads to increase non-kinetic capabilities; and change detection radar and moving target indicators to assist warfighters in battlespace awareness and force application.

RQ-7B Shadow Marine Corps Tactical UAS (MCTUAS)

The Fiscal Year 2016 President's Budget requests \$0.7 million in RDT&E,N for the RQ-7B Shadow to continue joint development efforts and government engineering support and \$3.8 million in APN to acquire PRC-152A radios and weatherization kits.

STRIKE WEAPONS PROGRAMS

Tactical Tomahawk (TACTOM) BLK IV Cruise Missile Program

The Fiscal Year 2016 President's Budget requests \$184.8 million in WPN for procurement of an additional 100 TACTOM weapons and associated support, \$28.0 million in OPN for the Tomahawk support equipment, and \$17.7 million in RDT&E,N for capability updates of the weapon system. WPN resources will be for the continued procurement of this versatile, combat-proven, deep-strike weapon system in order to meet ship load-outs and combat requirements. OPN resources will address the resolution of Tactical Tomahawk Weapons Control Station obsolescence, interoperability, and

information assurance mandates. RDT&E,N will be used to continue engineering efforts for A2/AD navigation and communication upgrades.

Tomahawk provides an attack capability against fixed and mobile/moving targets, and can be launched from both Surface Ships and Submarines. The current variant, TACTOM, preserves Tomahawk's long-range precision-strike capability while significantly increasing responsiveness and flexibility. TACTOM's improvements include in-flight retargeting, the ability to loiter over the battlefield, in-flight missile health and status monitoring, and battle damage indication imagery, providing a digital look-down "snapshot" of the battlefield via a satellite data link. Other Tomahawk improvements include rapid mission planning and execution via Global Positioning System (GPS) onboard the launch platform and improved anti-jam GPS.

Tomahawk Theater Mission Planning Center (TMPC)

The Fiscal Year 2016 President's Budget for TMPC requests \$7.5 million in RDT&E,N and \$43.2 million OPN for continued system upgrades and sustainment. TMPC is the mission planning and strike execution segment of the Tomahawk Weapon System. TMPC develops and distributes strike missions for the Tomahawk Missile; provides for precision targeting, weaponeering, mission and strike planning, execution, coordination, control and reporting. TMPC provides Combatant Commanders and Maritime Component Commanders the capability to plan and/or modify conventional Tomahawk Land-Attack Missile missions. TMPC optimizes all aspects of the Tomahawk missile technology to successfully engage a target. TMPC is a Mission Assurance Category 1 system, vital to operational readiness and mission effectiveness of deployed and contingency forces. Planned upgrades support integration, modernization and interoperability efforts necessary to keep pace with missile upgrades. These required upgrades keep pace with new imagery formats, threat changes, improved GPS denied navigation capability, mission planning timeline improvements, upgraded communications architecture. Additionally, Cyber security mandates will be

implemented to reduce TMPC vulnerability to cyber-attacks. These upgrades are critical for the support of over 180 TMPC operational sites worldwide, afloat and ashore, to include: Cruise Missile Support Activities (inclusive of US STRATCOM), Tomahawk Strike and Mission Planning Cells (5th, 6th, 7th Fleet), Carrier Strike Groups, Surface and Subsurface Firing Units and Labs/Training Classrooms.

Offensive Anti-Surface Warfare (OASuW)/Increment 1 Weapon

The Fiscal Year 2016 President's Budget requests \$285.8 million in RDT&E,N for the completion of technology maturation and initiation of integration and test of the air-launched OASuW/Increment 1 program. Increment 1 leverages the Defense Advanced Research Projects Agency Long Range Anti-Ship Missile (LRASM) weapon demonstration effort. Increment 1 provides Combatant Commanders the ability to conduct ASuW operations against high value surface combatants protected by Integrated Air Defense System with long-range Surface-to-Air-Missiles and denies the adversary the sanctuary of maneuver. The OASuW/Increment 1 program is a DoN led joint program, scheduled to field on the B-1 by the end of Fiscal Year 2018 and the F/A-18E/F by the end of Fiscal Year 2019.

Next Generation Strike Capability (NGSC)

The Fiscal Year 2016 budget requests \$9.6 million for initiation of efforts to develop a Next Generation Strike Capability (NGSC). As part of a long-term strike weapons strategy, NGSC will study long-range, survivable, multi-mission, multi-platform conventional strike capability options planned to IOC in the mid-2020 timeframe. NGSC will become the follow-on acquisition program to the current OASuW/Increment I (LRASM) and Tomahawk Weapon System modernization programs. The NGSC program will commence an Analysis of Alternatives (AoA) during Fiscal Year 2016. The AoA will assess existing weapons systems, emergent technologies, and industry internal research and development activities; develop potential program of record costs, schedules, and risk assessments; and conduct additional threat assessments based on

projected scenarios and operational environments. This analytical data will inform performance and relevant technology requirements to be matured as part of potential NGSC materiel solution(s) and associated kill-chain(s).

Sidewinder Air-Intercept Missile (AIM-9X)

The Fiscal Year 2016 President's Budget requests \$76.0 million in RDT&E,N and \$96.4 million in WPN for this joint DoN and USAF program. RDT&E,N will be applied toward the Engineering Manufacturing Development phase of critical hardware obsolescence redesign, Development Test of missile v9.4 software, and the design and development of Joint Chiefs of Staff directed Insensitive Munitions improvements. WPN funding is requested for production of a combined 227 All-Up-Rounds and Captive Air Training Missiles and missile-related hardware. The AIM-9X Block II Sidewinder missile is the newest in the Sidewinder family and is the only short-range infrared air-to-air missile integrated on Navy, Marine Corps, and USAF strike-fighter aircraft and Marine Corps attack helicopters. This fifth-generation weapon incorporates high off-boresight acquisition capability and increased seeker sensitivity through an imaging infrared focal plane array seeker with advanced guidance processing for improved target acquisition; data link capability; and advanced thrust vectoring capability to achieve superior maneuverability and increase the probability of intercept of adversary aircraft.

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

The Fiscal Year 2016 President's Budget requests \$32.2 million in RDT&E,N for continued software capability enhancements and \$192.9 million in WPN production of a combined 167 All-Up-Rounds and Captive Air Training Missiles and missile-related hardware. AMRAAM is a joint USAF and DoN weapon that counters existing aircraft and cruise-missile threats. It uses advanced counter-electronic attack capabilities at both high and low altitudes, and can engage from beyond visual range as well as within visual range. AMRAAM provides an air-to-air first look, first shot, first kill capability, while working within a networked environment in support of the Navy's Theater Air and

Missile Defense Mission Area. RDT&E,N will be applied toward Software upgrades to counter emerging Electronic Attack threats for AIM-120C/D missiles.

Small Diameter Bomb II (SDB II)

The Fiscal Year 2016 President's Budget requests \$97.0 million in RDT&E for continued development of the Department of the Air Force led joint service SDB II weapon and bomb-rack program. SDB II provides an adverse weather, day or night standoff capability against mobile, moving, and fixed targets, and enables target prosecution while minimizing collateral damage. SDB II will be integrated into the internal carriage of both DoN variants of the Joint Strike Fighter (F-35B and F-35C) as well as the Navy's F/A-18E/F. The Joint Miniature Munitions Bomb Rack Unit (JMM BRU) BRU-61A/A is being developed to meet the operational and environmental integration requirements for internal bay carriage of the SDB II in the F-35B and F-35C, and external carriage on F/A-18 E/F. JMM BRU entered Technology Development in June 2013.

Joint Standoff Weapon (JSOW)

The Fiscal Year 2016 President's Budget requests \$0.4 million in RDT&E,N to address software integration and interoperability following the completion of efforts associated with Operational Testing in Fiscal Year 2015, and \$21.4 million in WPN to begin Captive Air Training Missile (CATM) software integration, continuation of Telemetry Instrumentation Kit (TIK) Non Recurring Engineering and re-life efforts, and shutdown of the JSOW production line. The Department's decision to terminate JSOW C-1 production was due to fiscal constraints, an analysis of targets determining there was sufficient inventory to handle current operational needs, and the ongoing focus to fund future capabilities. The DoN has submitted a final 2014 termination Selected Acquisition Report and Congressional notification. The Navy is preparing a transition plan to address the production termination decision and document the planned use of RDT&E,N, WPN, and O&M,N resources to complete JSOW C-1 Operational Test activities, missile and TIK production, CATM conversions, and long-term weapon system operation & support.

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

The Fiscal Year 2016 President's Budget requests \$12.9 million of RDT&E,N for Block 1 follow-on development and test program, \$38.4 million of RDT&E,N for AARGM Extended Range (ER) development, and \$122.3 million of WPN for production of 138 All-Up-Rounds and Captive Training Missiles. The AARGM cooperative program with the Italian Air Force transforms the High-Speed Anti-Radiation Missile (HARM) into an affordable, lethal, and flexible time-sensitive strike weapon system for conducting Destruction of Enemy Air Defense missions. AARGM adds multi-spectral targeting capability and targeting geospecificity to its supersonic fly-out to destroy sophisticated enemy air defenses and expand upon the HARM target set. The program achieved IOC on the F/A-18C/D aircraft in July 2012, with forward deployment to U.S. Pacific Command, and integration is complete for AARGM with release of H-8 System Configuration Set for F/A-18E/F and EA-18G aircraft. The development of an AARGM-ER modification program, involving hardware and software improvements, will begin in Fiscal Year 2016. This effort will increase the weapon system's survivability against complex, new, and emerging threat systems and enable launch platforms greater stand-off range.

Joint Air-to-Ground Missile (JAGM)

The Fiscal Year 2016 President's Budget requests \$25.9 million in RDT&E,N to begin a five year integration effort of JAGM Increment 1 onto the Marine Corps AH-1Z in support of an Initial Operational Capability by Fiscal Year 2019. JAGM is a Department of the Army led, joint pre-Major Defense Acquisition Program. JAGM is a direct attack/close-air-support missile program that will utilize advanced seeker technology and be employed against land and maritime stationary and moving targets in adverse weather and will replace the Hellfire and TOW II missile systems. In November 2012, the Joint Chiefs of Staff authorized the JAGM incremental requirements and revalidated the

DoN's AH-1Z Cobra aircraft as a threshold platform. JAGM Increment 1 is expected to achieve Milestone B certification in Fiscal Year 2015.

Advanced Precision Kill Weapon System II (APKWS II)

The Fiscal Year 2016 President's Budget requests \$53.5 million in PANMC for procurement of 1,834 APKWS II Precision Guidance Kits. APKWS II provides an unprecedented precision guidance capability to DoN unguided rocket inventories, improving accuracy and minimizing collateral damage. Program production continues on schedule, meeting the needs of our warfighters in today's theaters of operations. IOC was reached in March 2012 on the Marine Corps' AH-1W and UH-1Y. These platforms have expended more than 170 APKWS II weapons in combat. Marine Corps AH-1Z platforms will be certified to fire APKWS II in Fiscal Year 2015. The Navy successfully integrated APKWS II on the MH-60S for an Early Operational Capability in March 2014 and is on track to finalize a similar effort for the MH-60R in March 2015.

CONCLUSION

We are an agile strike and amphibious power projection force in readiness, and such agility requires that the aviation arm of our naval strike and expeditionary forces remain strong. Mr. Chairman, and distinguished committee members, we request your continued support for the Department's Fiscal Year 2016 budget request for our Naval Aviation programs.