NOT FOR PUBLICATION UNTIL RELEASED BY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

STATEMENT OF

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BEFORE THE

SUBCOMMITTEE ON SEAPOWER OF THE

SENATE ARMED SERVICES COMMITTEE

ON

DEPARTMENT OF THE NAVY FISCAL YEAR 2022 BUDGET REQUEST FOR SEAPOWER

JUNE 8, 2021

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SUBCOMMITTEE ON SEAPOWER

Chairwoman Hirono, Ranking Member Cramer and distinguished members of the Subcommittee, thank you for the opportunity to appear before you today to address the Department of Navy's Fiscal Year (FY) 2022 budget request for Seapower capabilities. First, we would like to thank Congress and this Committee for your leadership and support of the Department of the Navy (DON) acquisition, sustainment, research and development programs. The FY 2021 Authorization and Appropriation Acts provided essential support for the DON's shipbuilding, aviation and ground programs that are the foundation of our maritime service and are essential to a full range of military operations in support of our national security priorities.

In an increasingly interconnected and interdependent world, a dominant naval force and a strong maritime strategy are critical to the security of the Nation. The global security environment is increasingly influenced by our competitors, requiring the Navy and Marine Corps team to operate continually to provide credible combat power forward and a ready response force to global crises and disasters. Amidst these traditional challenges, our forces have adapted global operations in response to the COVID-19 pandemic in ways that were unimaginable in early 2020. As our national security posture evolves to confront new challenges, the DON continues to invest in key capabilities that maximize our naval power contribution to the Joint Force and ensure a proper balance of readiness, capability, and capacity within the limits of available resources.

To address the growing demands placed on our warfighters, the DON is making necessary investments in lethal capabilities across a broad spectrum of platforms and programs. Since the start of FY 2020 we have delivered 13 relevant and capable war ships to the Fleet including two *Arleigh Burke* class destroyers, two *Virginia* class submarines, four Littoral Combat Ships, two Expeditionary Fast Transport ships, one Amphibious Assault Ship, and one Expeditionary Sea Base, and one *Zumwalt* class destroyer following its combat systems delivery. Today, the Navy has 74 ships under contract with 51 ships in construction. We expect to take delivery of an additional ship in FY 2021, and plan to award contracts for three more ships this year. On the aviation side, we will deliver 54 new manned aircraft and four unmanned aircraft to Navy and Marine Corps units in FY 2021, improving capability and enabling the divestiture of less affordable and less capable legacy systems.

The Navy continues the maturation of critical warfighting investments. CVN 78 successfully completed its post-delivery testing and trials (PDT&T) period in April 2021 and will conduct Full Ship Shock Trials from May-August 2021. During PDT&T the ship was at sea 50

percent of the time - certifying and testing systems and training the crew, while also being used for pilot generation, a critical need for carrier airwing readiness. In March 2021, VFA-147, the first operational F-35C squadron, completed the longest at-sea period (approximately five weeks) by F-35Cs onboard USS Carl Vinson (CVN 70). VFA-147 completed missions in all warfare areas while reporting a 97.6 percent sortie completion and 80 percent Mission Capable rates. FY 2021 funds completed the procurement of three MQ-25A System Demonstration Test Article (SDTA) aircraft and supported the development of six SDTAs for Next Generation Jammer Mid-Band (NGJ-MB) Engineering & Manufacturing Development (EMD). These crucial investments will continue to advance our warfighting edge against adversaries.

Additionally, the Department achieved over 80 percent Mission Capable rates for the F/A-18E/F and EA-18G fleets and achieved an 80 percent Mission Capable rate for E-2Ds in FY 2020. These positive trends are continuing in FY 2021, on-going efforts are focused on maintaining these advances by applying lessons learned across all type model series aircraft to reduce long-term sustainment costs.

Nearly 70 percent of today's fleet will be in service through 2030, so accelerating the momentum of on-time delivery for ships, submarines and aircraft coming out of maintenance availabilities remains a priority for the Department. We continue to use available data to provide better predictability, improve performance, share lessons learned, and reduce costs. By taking a more forward-looking approach to maintenance and modernization of our ship and aviation platforms, the DON can grow the operational capacity of the Navy in a healthier way over time. We will communicate future demand signals to our industrial partners, stabilizing the industrial base and ensuring sufficient capacity.

The Navy is seeing positive early results from the pilot program established by Congress in FY 2020 to fund Pacific Fleet CNO Availabilities with multi-year Other Procurement, Navy (OPN) funding. The OPN Pilot allows the Navy to implement commercial best practices for ship maintenance and more efficiently use surface ship maintenance funding through the entirety of the fiscal year without the pressure of expiring funds. The FY 2022 budget requests expansion of the OPN pilot to include U.S. Fleet Forces CNO Availabilities. The Navy is demonstrating significant improvement in ship maintenance execution, and efforts such as OPN-funded availabilities are helping maintain the positive momentum to ensure ships are delivered to the Fleet on time with work completed in full.

Unmanned systems have and will continue to play a key part in future Distributed Maritime Operations (DMO), and there is a clear need to field affordable, lethal, scalable, and connected capabilities. The *Unmanned Campaign Plan* serves as a comprehensive strategy for fielding the DON's future unmanned capabilities into the fleet. The Department will take advantage of near-term opportunities for rapid experimentation, while investing in enabling technologies to include autonomy, land-based testing sites, high-reliability engineering systems, and networks in conjunction with Project Overmatch. The DON developed the *Unmanned Campaign Plan* to direct an enterprise-wide partnership along with industry and academia to coordinate efforts and resources and take advantage of innovation opportunities such as Commander Pacific Fleet's Integrated Battle Problem 21. We look forward to working with the Congress on advancing our naval unmanned contribution to the joint force.

The Fiscal Year 2022 President's Budget Request

The President's FY 2022 budget advances key DON priorities to defend the nation, innovate and modernize the Department, increase resilience and readiness, and build a workforce to compete and win. It balances the urgent readiness needs of our force today with investments that maximize our naval contribution to the Joint Force, and reflects hard decisions to divest of less capable platforms and systems, freeing resources to invest in a future force that can deliver greater efficiency and effectiveness.

The FY 2022 request continues key investments in advanced technologies and modernization of our current Seapower and Projection forces, prioritizing the recapitalization of the strategic ballistic missile submarine, the *Columbia* class, which remains the Navy's highest acquisition priority. The budget requests funding for eight Battle Force Ships, 107 total aircraft, and completes procurement of V-22 and P-8A, while maturing production and maintaining vital aviation platforms to support a robust and technologically advanced fleet.

The FY 2022 budget supports the sustainment of our readiness recovery to deliver credible ready forces now by accelerating the Navy's Shipyard Infrastructure Optimization Program (SIOP) and fully funding two submarine overhauls in private shipyards. The request is aggressive in its pursuit of increased lethality and modernization with the greatest potential to deliver non-linear warfighting advantages. It accomplishes this by beginning significant research and development investments for future platforms, and supporting DMO that will seamlessly

network sensors, platforms (manned and unmanned) and weapons for decision advantage. This includes prioritization of force design and delivery of Naval Expeditionary forces capable of imposing costs on global competitors with distributed, lethal power, and the delivery of capable capacity.

The FY 2022 budget prioritizes a capable and lethal force, delivering platforms that are more capable, networks, combat systems and weapons while divesting of less capable legacy platforms. The budget balances resources and requirements to weigh the effects of program decisions on the industrial base, maximizing efforts in support of the President's Executive Order on Ensuring the Future is Made in All of America by All of America's Workers, and the Build Back Better initiatives. The budget shows a realistic and forward-thinking approach to planning the future force, while providing future capability requirements within projected budgets. The budget takes into consideration the need to keep America's industrial base loaded at an executable level that encourages industry investment in capital improvements, capital expansion, and a properly sized world-class workforce.

Summary

Thank you for the strong support this Subcommittee continues to provide our Sailors and Marines. The Department of the Navy continues to deliver platforms with the requisite capability to address the maritime challenges of today with an eye to the evolving security environment of tomorrow. To achieve the most capable Navy, we are instilling affordability, stability, technical rigor, and capacity into our programs to deliver these vital platforms to the warfighter faster within the resources provided. With Congress' continued support, we will provide the Nation with the Integrated All-Domain Naval Power for the Joint Force that is required to win today and tomorrow.

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

U.S. NAVY AND MARINE CORPS SEAPOWER CAPABILITIES

SHIP PROGRAMS

Submarines

Ballistic Missile Submarines, coupled with the TRIDENT II D-5 Strategic Weapons System (SWS), represent the most survivable leg of the Nation's strategic arsenal and provide the Nation's most assured nuclear response capability. The *Columbia* class program remains the Navy's number one acquisition priority. The lead ship started construction in October 2020 and is on track to deliver to pace the retirement of our current ballistic missile submarines, deploying for its first patrol by 2030.

The FY 2022 budget supports the continued incremental funding of the lead ship, advance procurement and advance construction of follow-on *Columbia* class submarines, and continued class design efforts. General Dynamics Electric Boat and Huntington Ingalls Industries-Newport News continue to procure component and commodity material to maintain and grow the submarine industrial base as the program builds to annual procurement beginning in FY 2026. Supporting overall program risk reduction and required schedule execution to minimize strategic deterrence coverage gaps, the FY 2022 budget request also funds Continuous Production of Missile Tubes (and associated components) and Propulsors, and Multi-Program Material Procurement/ Production Back-up Units. *Columbia*'s Missile Tube production is tightly coordinated with procurement of Common Missile Compartment material for the U.K. *Dreadnought* class submarines being executed under the Polaris Sales Agreement. Also included in the FY 2022 budget are development efforts to make submarines more capable.

The Navy delivered two *Virginia* class submarines in FY 2020, including the first Block IV ship, the USS *Vermont* (SSN 792). The Navy continues to build on past success with the Block V multi-year procurement (MYP) contract for the construction of nine ships, and the FY 2021 award of an option to add a tenth ship to the Block. This subcommittee's leadership and guidance played an integral role in ensuring funds were authorized and appropriated for the Navy to rapidly award the option for the 10th boat of the Block V. The second ship of Block V introduces the Virginia Payload Module, and all Block V ships will incorporate Acoustic Superiority program improvements.

The Navy, shipbuilders and related suppliers recognize that vigilance in execution and oversight of the *Virginia* and *Columbia* programs is critical. In FY 2021 the Navy is using the

$130 million provided for industrial base support in the *Columbia* funding line to continue to execute supplier development efforts to improve the capability, capacity and stability of the industrial base. Additionally, the Navy is implementing Continuous Production for *Columbia* on selected shipyard-manufactured items to reduce cost and schedule risk, and help strengthen the industrial base with a focus on critical vendors. Advance Construction activities began June 2019 at General Dynamics Electric Boat and Huntington Ingalls Industries-Newport News to proactively manage schedule margin and reduce controlling path risks for *Columbia*.

Aircraft Carriers

The Navy continues to focus on making USS *Gerald R Ford* (CVN 78) ready for operational use, and continues to see increased reliability on the new critical technologies. The Advanced Weapons Elevators (AWEs) have been cycled over 15,000 times, including 7,803 at sea, and are performing as designed. CVN 78 successfully completed 8,157 aircraft launches and recoveries. Readying *Ford* for deployment is a Navy priority and the Department is working collectively with the Navy shipbuilding industry to transition *Ford* into Fleet operations.

John F Kennedy (CVN 79) is 79 percent construction complete. *Kennedy* transitioned to a single-phase delivery to achieve the most efficient path forward and deliver a more capable and lethal ship to the Fleet. CVN 79 is on schedule to deliver in 2024 with a complete combat systems suite and fully outfitted with F-35C ship modifications. *Enterprise* (CVN 80) construction is eight percent complete by construction man-hours and *Doris Miller* (CVN 81) has commenced material procurement. Additionally, CVN 80 is on schedule to meet its first major construction milestone, keel laying, in the second quarter of FY 2022.

The *Nimitz* class Refueling Complex Overhaul (RCOH) is key to both the maintenance and modernization of each carrier in support of the second half of its service life. The RCOH is refueling the ship's reactors, modernizing its capabilities, and repairing ship systems and infrastructure. USS *George Washington's* (CVN 73) RCOH is 89 percent complete with re-delivery planned for August 2022. USS *John C. Stennis* (CVN 74) commenced RCOH in May 2021 and USS *Harry S Truman* (CVN 75) will begin RCOH in FY 2025.

Large Surface Combatants

The Arleigh Burke class (DDG-51) program remains one of the Navy's most successful

shipbuilding programs with 69 ships delivered to the Fleet. Over the course of the FY 2018-2022 MYP, the Navy will procure a total of 11 Flight III DDGs, more than the planned 10 ship procurement. From a warfighting perspective, procuring one DDG-51 in FY 2022 will still provide the near-term capacity required. The shipbuilders have a total of 20 DDG-51s under contract, with 11 under construction. We assess that there is adequate near-term backlog of work at each shipyard. Navy intends to evaluate the benefits of DDG-51 FLT III follow-on MYP contracts in FY 2023-2027 to maintain the industrial base and continue to provide the latest capability to the Fleet while the DDG(X) design and risk reduction efforts are executed in parallel. These Flight III ships will provide enhanced Integrated Air and Missile Defense with the AN/SPY 6(V)1 Air and Missile Defense Radar (AMDR) and AEGIS Baseline 10. AMDR meets the growing ballistic missile threat by improving radar sensitivity and enabling longer range detection of increasingly complex threats. The program demonstrated design maturity through its successful completion of all developmental testing. AMDR is in production for delivery to support Flight III ships. AN/SPY 6(V)1 arrays for the first Flight III ship have delivered and will support Flight III delivery and Initial Operational Capability (IOC). The first DDG 51 Flight III ship (DDG 125) will deliver in FY 2023. Flight III leverages the proven Flight IIA platform with modifications for hull stability, cooling (350-ton AC plants) and power (4 MW generators / 4160 VAC) to accommodate AMDR. Aligned with Congressional intent, risk reduction integration testing of critical Flight III systems (AN/SPY-6(V)1, Aegis Baseline 10, and power systems) will occur at land based test sites, to reduce risk prior to lead ship activation. The Land Based Engineering Site began electrical plant testing in FY 2021, and the Combat Systems Engineering Development Site achieved standalone activation of the SPY-6 array in April 2021.

Complementing the DDG 51, the DDG 1000 *Zumwalt* class guided missile destroyers provide multi-mission surface combatants designed to provide long-range, offensive surface strike capabilities. The DDG 1000 program continues to accomplish first-time integration of unique combat systems elements, complete PDT&T, train the crew on ship functions, and demonstrate operational performance. USS *Zumwalt* (DDG 1000) is scheduled to reach IOC in December 2021. *Michael Monsoor* (DDG 1001) final delivery is planned for March 2022. Completion of the planned construction and HM&E test and activation of *Lyndon B Johnson* (DDG 1002) at General Dynamics Bath Iron Works is 98 percent complete. Delivery of the ship is now planned for a

single delivery approach following the completion of Combat Systems installation, test and activation follow-on work.

DDG 51 Flight III is highly capable, but after over 40 years in production and 30 years of upgrades, the hull form cannot accommodate the future capabilities identified by the Future Surface Combatant Force Analysis of Alternatives (FSCF AoA), including high power Directed Energy, larger missiles, increased magazine depth, sensor growth, and efficient integrated power. The future Large Surface Combatant, DDG(X), will provide the flexibility and margins necessary to succeed DDG 51 class as the Navy's next enduring large combatant. In its initial form, DDG(X) will combine the DDG 51 Flight III combat system elements with a new hull form, an efficient Integrated Power System and greater endurance reducing the Fleet logistics burden. DDG(X) will reduce combat system development risk by utilizing mature technologies that leverage the DDG 51 Flight III Navy standard program of record combat system elements and reduce engineering system development risk by land based testing of the propulsion and electrical system integration prior to detail design. Top Level Requirements were approved by the CNO in December 2020 as the basis for the Draft Capability Development Document. The Navy partnership with industry will include shipbuilder participation driving to a stable requirements baseline, concept design, and a ship designed for producibility as well as flexibility.

Small Surface Combatants

Strategic competition and the on-going focus on the Indo-Pacific requires a more capable Small Surface Combatant for operations in contested environments. The FFG 62 *Constellation* class is the evolution of a ship design with increased lethality, survivability, and improved capability to support the full range of military operations as part of a more lethal Joint Force. FFG 62 Capability Requirements are mature and have been refined through early engagement with industry in a collaborative Conceptual Design process that completed in June 2019. The FFG 62 program is managing development risk by combining proven ship designs with mature, best-of-breed Government Furnished Equipment designated combat system elements. The Navy will establish a FFG 62 Land Based Engineering Site to test power and propulsion systems prior to ship activation. The lead ship is under contract and is expected to start construction in FY 2022, and the second ship of the class, future USS *Congress*, was put on contract last month. The Navy is confident in the capability FFG 62 will deliver to the Fleet.

The Littoral Combat Ship (LCS) program has delivered 23 of the 35 total planned ships. By the end of calendar year 2021, 27 LCSs will have been delivered and 20 will be available to the Fleet commanders. The program plan for these ships is: four dedicated test ships; eight Surface Warfare (SUW) ships; eight Anti-Submarine Warfare (ASW) ships; and 15 Mine Countermeasure ships. The initial two test ships will decommission in FY 2021 and the third and fourth test ships will complete testing and decommission, along with LCS 7 and 9, by the end of FY 2022 to re-prioritize funding for modernization, capability upgrades, and sustainment.

The Navy has installed Naval Strike Missile (NSM) on four *Independence*-variant LCS platforms and continues to install NSM on LCS hulls this year and in the future, extending the offensive capability of the ship. Additionally, procurement of material for Lethality and Survivability upgrades is on track for the first installations in FY 2023. Eleven LCS will have conducted their inaugural deployments to 7th or 4th Fleet by the end of FY 2022, providing a significant increase in contact layer assets for Fleet Commanders which will continue to grow as the remaining ships are delivered to the Fleet.

Following the theme of divesting legacy capacity and force structure, the Navy's plan to divest two additional cruisers (CGs) in FY 2022, beyond the five previously planned for FY 2022, enables continuation of funding for the five CGs in modernization. CGs remain Navy's primary Air and Missile Defense Commander platform until Flight III destroyers are delivered in the mid 2020's.

Amphibious Ships

Amphibious warfare ships remain a key component of the Nation's global forward presence, playing a pivotal role in responding to world crises and supporting a broad range of missions across the spectrum of conflict. Today, these ships are persistently forward deployed, competing below the level of armed conflict while living within the range of enemy fires, building partner capacity, and deterring enemy aggression. Partnered with industry, the DON is committed to delivering the most capable multi-mission amphibious warfare ship.

America class (LHA 6) will replace the decommissioned LHA 1 *Tarawa* and aging LHD 1 *Wasp* class ships. USS *America* (LHA 6) returned from deployment as the centerpiece of the *America* Amphibious Readiness Group/Marine Expeditionary Unit with the F-35B operating from the flight deck. USS *Tripoli* (LHA 7) delivered in February 2020 and is completing its post-

delivery efforts to make the ship Joint Strike Fighter-capable and ready for its planned deployment in FY 2022. *Bougainville* (LHA 8) is 33 percent construction complete with 107 units erected to support a FY 2025 delivery. LHA 8 will include a well deck to increase operational flexibility and includes a reduced island structure that increases flight deck space to enhance aviation capability. LHA 9 has commenced long lead-time material procurement. All LHAs will be F-35B capable.

San Antonio class (LPD 17) provides the ability to embark, transport, and land elements of a landing force by helicopters, tilt rotor aircraft, landing craft, and amphibious vehicles. *Fort Lauderdale* (LPD 28) is 91 percent complete and planned for delivery in January 2022, while *Richard M. McCool Jr.* (LPD 29) is 53 percent complete and planned for delivery in the fourth quarter of FY 2023. LPD 28 and LPD 29 leveraged many design innovations and cost reduction initiatives, including the first install of the Enterprise Air Surveillance Radar (EASR) on LPD 29, as the class transitions to Flight II, integrating more high-level capabilities. The Navy awarded the first Flight II ship, *Harrisburg* (LPD 30), in March of 2019. It is eight percent complete with a planned delivery in the second quarter of FY 2025. In addition, the Navy awarded the *Pittsburgh* (LPD 31) Detail Design and Construction contract in April 2020 with delivery planned in the second quarter of FY 2027.

Light Amphibious Warship

In support of maritime competition and potential conflict, the Navy is conducting an Analysis of Alternatives and will commence with Concept Studies and Preliminary Design to evaluate a new medium intra-theater amphibious platform. Studies will primarily focus on commercial designs tailored for military application to enable maneuver and mobility for our integrated naval forces conducting DMO. The Department is driving towards a lead ship contract award as early as FY 2023 that will support the Marine Corps' future Marine Littoral Regiments in the Indo-Pacific region. The Light Amphibious Warship is complementary to traditional large amphibious ships; both types of ships are required to deliver Marine Corps forces to expeditionary locations.

Connectors

The Ship to Shore Connector (SSC) program provides the capability to rapidly project assault forces within the littoral operational environment to ensure the Joint Force Commander's

ability to conduct amphibious operations maneuvering over-the-beach, over ice, mud, rivers, swamps and marshes. The Landing Craft, Air Cushion (LCAC) 100 class craft are the functional replacement for the legacy LCAC craft, which began reaching end of their service life extensions in 2015. The Department remains committed to maintaining this critical non-displacement craft capability with the procurement of the new LCAC 100 class and the LCAC extended service life extension program (E-SLEP) initiative for the current LCAC class. Technical issues have been resolved and production has stabilized, with craft deliveries proceeding in support of the program plan. The Navy is also replacing its aging Landing Craft Utility (LCU) fleet with the LCU 1700 program which will restore LCU's complementary heavy lift payload in a more rugged, reliable, and affordable independent operations capable platform.

Auxiliary Ships, Expeditionary, and Other Vessels

Expeditionary support vessels are highly flexible platforms used across a broad range of military operations supporting multiple operational phases. The Expeditionary Sea Base (ESB) is part of the critical access infrastructure that supports the deployment of forces and supplies to provide prepositioned equipment and sustainment with flexible distribution. The Navy commissioned USS *Miguel Keith* (ESB 5) on May 8, 2021. The ESB 6 and ESB 7 have planned deliveries in FY 2022 and FY 2024. Expeditionary Fast Transport (EPF) is a shallow draft, all aluminum, commercial-based catamaran capable of intra-theater personnel and cargo lift, providing combatant commanders high-speed sealift mobility with inherent cargo handling capability and agility to achieve positional advantage over operational distances. USNS *Newport* (T-EPF 12) was delivered in September 2020. *Apalachicola* (T-EPF 13) and *Cody* (T-EPF 14) are under construction with deliveries planned in FY 2022 and FY 2023, respectively. T-EPF 13 will include installation of evolutionary autonomy functions; serving as important point of learning as Navy advances its unmanned vessel efforts. T-EPF 14 and T-EPF 15 will incorporate fact-of-life and operational improvements that will enable an embarkable Role 2 Enhanced medical capability that allows naval forces to effectively deploy, survive, operate, maneuver, and regenerate in support of DMO.

The Combat Logistics Force (CLF) consists of T-AOE fast combat support ships, T-AKE dry cargo and ammunition ships, and T-AO fleet replenishment oilers. CLF ships fulfill the vital role of providing underway replenishment of fuel, food, repair parts, ammunition and equipment to

forward-deployed ships and embarked aircraft, to enable them to operate for extended periods at sea. The *Kaiser* class (T-AO 187) fleet replenishment oilers will be replaced with the *John Lewis* class fleet replenishment oilers, designated T-AO 205 class. T-AO 205 is 91 percent complete and planned for delivery in March 2022. The two follow-on ships of the class, are 73 and 18 percent complete, respectively. Construction on the fourth ship, future USNS *Robert F Kennedy* (T-AO 208), began in May 2021. The FY 2022 budget requests funding for one T-AO.

Navajo, the first of a new class of combined towing, salvage, and rescue (T-ATS) ship is scheduled to deliver in August 2022. T-ATS is based on existing commercial towing offshore support vessel design, and will provide ocean-going tug, salvage, and rescue capabilities to support Fleet operations. The Navy expects to award two ships in FY 2021, and requests funding for two additional ships in FY 2022. The FY 2022 budget also requests funding for a T-AGOS(X)) to begin recapitalizing the Navy's Auxiliary General Ocean Surveillance ships.

The Navy's shipbuilding plan provides sustained demand for commercial shipbuilding with the aforementioned Fleet Replenishment Oiler Recapitalization (T-AO 205 Class) and Towing, Salvage, and Rescue Ships (T-ATS 6 Class), as well as Cable Ships (T-ARC(X)), Submarine Tenders (AS(X)) and Next Generation Logistics Ship (NGLS).

Strategic Sealift

The Navy continues execution of its sealift recapitalization plan, and has worked closely with USTRANSCOM to develop an effective acquisition plan to recapitalize the Department's aging strategic sealift capability at a level of moderate risk. This three-phased approach includes acquiring used commercial vessels for the surge sealift force, constructing new ships for the Maritime Prepositioning Force (MPF) to replace capacity that will begin to reach end of service life in 2029, and extending the service life of viable platforms. The FY 2022 budget continues the readiness and recapitalization commitments by providing additional used vessel procurements to replace surge sealift capability, increased material readiness of existing ships, retirement of the least ready vessels, and service life extensions. The Navy projects the newly procured used sealift vessels will require conversion and upgrade work to fully meet military requirements. This work will be performed in U.S. shipyards. We appreciate this Committee's support for the authority to procure additional used ships to recapitalize the surge sealift fleet and request that Congress remove remaining obstacles to used ship procurement. Additionally, Navy and U.S Marine Corps

are teaming to produce MPF Next Generation requirements and transition plans. Sealift new construction is most appropriate for the replacement of fully operational status ships in the MPF which support Marine Corps.

Sustainment, Modernization and Service Life Extensions

Sustaining the Navy's force structure through the maintenance and modernization of its naval vessels is key to ensuring they can meet operational demands over their design service lives and provide required capability to Fleet Commanders. The Navy has implemented targeted initiatives aimed to reduce maintenance backlogs and improve outcomes of maintenance availabilities covering the spectrum of work planning, contracting, and execution. In our public yards, the Navy is growing the capacity of the shipyards to meet the workload demand, improving the training and productivity of the workforce, and making the needed investments in our shipyards to ensure they are optimally sized, configured and modernized to best execute their mission requirements. In the private shipyards, the Navy has focused on improving the completeness, accuracy, and timeliness of planning; working to ensure material availability; adjusting Fleet maintenance schedules to level load the ports; revising acquisition strategies to continue to promote competition, learning, stability and predictability; and streamlining Navy inspection points to improve efficiencies.

The fiscal realities facing the Navy make it imperative to maintain our in-service ships to achieve their expected service lives and maintain their relevant combat systems through modernization efforts. The FY 2022 budget requests funding for the modernization of three destroyers to sustain combat effectiveness, ensure mission relevancy, and achieve the full expected service lives of the AEGIS Fleet. Stand-alone and incremental modernization efforts and execution will continue to be assessed and aligned to defeat our adversaries throughout the life-cycle of the DDG 51 class. The Navy has evaluated the most effective balance between costs and capability by extending the service life of the most capable ships in the cruiser fleet while removing the cruisers that have the least effective ballistic missile defense capability to provide the Air and Missile Defense Commander coverage. Planning is in progress for the inactivation of the first *Nimitz* class aircraft carrier. Upholding prior commitments by the Navy to utilize the *Nimitz* class to the maximum benefit of the Nation, technical analysis of USS *Nimitz* (CVN 68), in conjunction with the latest maintenance and operational schedules, supports a limited service life

extension of approximately one year past fifty years.

Shipyard Infrastructure Optimization Program (SIOP)

The Navy's four public shipyards are essential elements of our national defense. Government owned and operated, the public shipyards provide depot-level maintenance to ensure that the Navy's nuclear powered aircraft carriers and submarines are available to meet the nation's defense priorities. The Navy is in year three of the SIOP effort to transform the shipyards, positioning them to execute complex maintenance availabilities required to support a growing Navy. The plan focuses on three major areas for each of the Navy's public shipyards: dry dock recapitalization to support both current and future classes of ships; facility layout to optimize workflow within the shipyards; and capital equipment modernization to increase productivity and safety. The Navy is currently conducting a detailed analysis to support updated cost estimates.

Phase II of the SIOP -- focused on executing enhanced industrial engineering analysis and the modeling and simulation of industrial processes -- is well underway. The Navy is building shipyard Digital Twins and Area Development Plans (ADPs) that will guide infrastructure modifications within the shipyard to enhance productivity. ADPs for the four public shipyards are scheduled to complete by FY 2025, with the program moving into the execution of the SIOP upon completion.

Concurrent with the ADP effort, SIOP is moving forward with dry dock recapitalization projects, facility restoration, and capital equipment investments required to meeting the demands of the Navy's Fleet Commanders. In addition, the Navy continues integrating SIOP efforts with ongoing shipyard focused initiatives including Industrial Process Innovation, Shipyard Performance to Plan and Naval Sustainment System Shipyards to meet projected maintenance demands. These efforts represent a substantial capital investment to deliver efficient and modernized shipyards to support the Navy fleet.

Unmanned Surface and Undersea Vehicles

The DON is using a Family of Systems strategy to develop and employ unmanned surface and undersea capabilities that augment the manned force, and increase the cost imposed on our competitors. The Department is developing modular and capable force-multiplying unmanned

surface systems that significantly increase the standoff, reach, and protection of our manned platforms. These unmanned surface systems will be teamed with manned platforms to achieve surface dominance as outlined in the initial unmanned surface vehicle (USV) Concept of Operations (CONOPS) document completed by the Surface Development Squadron in January 2021.

As directed in the FY 2021 National Defense Authorization Act, the Navy is conducting a Distributed Offensive Surface Fires AoA to compare the currently planned large unmanned surface vessel (LUSV) with an integrated missile launcher payload against a broad range of alternative surface platforms and capabilities to determine the most appropriate vessel to deliver additional missile capability and capacity to the surface force. We expect to complete this analysis and report our findings to Congress before the end of this calendar year.

The Navy's LUSV builds upon work funded by DoD's Strategic Capabilities Office (SCO) and experimentation executed by the Navy USVs in Project Overlord. LUSV will be a high-endurance vessel based on commercial specifications, capable of weeks-long deployments and trans-oceanic transits. With a large payload capacity, the LUSV will be designed to conduct a variety of warfare operations initially in conjunction with manned surface combatants while under the positive control of a man-in-the-loop for employment of weapons systems. The Navy is taking an iterative, systems engineering approach to obtaining this technology and has designed an integration and experimentation plan that will validate high reliability mechanical and electrical systems, autonomous navigation and maneuvering, integration of combat system, and platform command and control capabilities prior to employment opportunities.

LUSV Design Studies contracts were awarded in September 2020 to six Industry teams to provide robust collaboration with government and industry to assist in maturation of platform specifications, and ensure achievable technical requirements are in place for a follow on development contract. Both Industry and the Navy are using these collaborative interactions to significantly advance the knowledge base that will feed into the LUSV program.

Medium unmanned surface vehicle (MUSV) is an unmanned sensor-ship, built to carry modular payloads, and standardized for easy integration with current Navy systems. Inexpensive compared to manned combatants, MUSVs can be built in numbers, quickly adding capacity to the Fleet. MUSV delivers a distributed sensor network that can navigate and operate with man in/on the loop oversight, and will be capable of weeks-long deployments and trans-oceanic transits. The

Navy awarded a design and fabrication contract to develop the first MUSV prototype which is targeted for delivery in FY 2023.

The Navy has benefited through its prototyping and experimenting with Sea Hunter and Overlord unmanned surface vessel prototypes accumulating over 3,100 hours of autonomous operations to include teaming with other manned ships. The Navy will continue experimentation and reliability demonstration efforts in FY 2021 and FY 2022 on the two SCO-funded Overlord vessels as ownership shifts to the Navy. The Navy is also building two additional Overlord prototypes that will deliver in FY 2022 to support continued experimentation, and future mission CONOPS. The Navy is evaluating other DMO applications to include logistics supply and refueling, Marine Corps expeditionary options, and enhancements to other surface platform missions. As part of this evaluation, the Navy is collaborating with Military Sealift Command and the Marine Corps to modify a T-EPF with autonomy to gain more autonomy knowledge and reliability on a class of ship equipped with V-22 landing capability, a large logistic and personnel size, weight and power capability, and the ability to operate at high speeds.

The Mine Countermeasures (MCM) USV program is development and production of MCM USV craft and Payload Delivery Systems to meet MCM Mission Package requirements. It leverages the mature craft and sweep payload developed for the Unmanned Influence Sweep System program that achieved Milestone C and Low Rate Production in FY 2020. Mine hunting payload integration (with the AN/AQS-20 towed sonar) is in progress and mine neutralizing payload integration is beginning development with the Barracuda program. Additionally, the Navy awarded a Multi Award Contract Indefinite Delivery/Indefinite Quantity in FY 2020 to provide the key enabling technologies for the unmanned surface Family of Systems.

In the undersea domain, the Navy has begun fabrication of Orca Extra Large Unmanned Undersea Vehicle (XLUUV). A competitive RFP was issued in FY 2020 for initial production of Snakehead, the Large Displacement UUV, and for production of a Medium UUV that supports both the submarine launched Razorback environmental sensing mission, as well as the Maritime Expeditionary MCM UUVs mission. In support of these new capabilities, the Navy is also investing in enabling technologies, such as autonomy, command and control, energy, and payloads, as well as establishing the interoperable standards and open architectures for ease of technology transition. These technologies and standards are the foundation necessary to ensure integration and transition to the fleet using a disciplined approach.

The Navy recently made a significant advance in UUV autonomy by integrating artificial intelligence, machine learning (AI/ML) automated target recognition for naval mines aboard the current expeditionary UUV program of record, the MK 18 Family of Systems. The deep learning algorithm now fielded for the MK 18 detects mine-like objects in the water for Sailors operating the UUVs. By the end of the year, software aboard the UUV will also adapt the UUV's mission pattern to identify objects of interest, making the MK 18 the Navy's first intelligent UUV. The Navy is assessing the utility of AI/ML for mine identification as we develop the enabling technologies critical to affordable and scalable unmanned systems.

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

Combat Systems

The Department continues to field the most capable and lethal surface and submarine combat systems in the world. AEGIS Combat System Baseline 9 delivers unprecedented offensive and defensive capabilities, including offensive strike and ASW, and simultaneous air and ballistic missile defense on destroyers and Air Defense Commander capability on cruisers. AEGIS Baseline 10 will incorporate the AN/SPY 6(V)1 AMDR for DDG 51 FLT III ships providing significant performance improvements over the AN/SPY 1D(V) radar and expanding the sensor coverage and enhancing the Navy's ability to perform the Integrated Air and Missile Defense mission.

The DON uses open architecture that takes full advantage of evolving technology to rapidly deliver real-time, reliable, and actionable information to the warfighter and works towards breaking the paradigm of hardware-software dependent deliveries. Using virtualization technology, the AEGIS virtual twin system -- a prototype of the AEGIS Virtual Combat Management System -- is able to support the delivery of iterative updates to the AEGIS Weapon System. Navy is investing in accelerating upgrades to Integrated Combat Systems in order to

ensure continuous combat superiority at sea. In addition, the Navy just stood up its first weapons system software factory (The Forge) which, in cooperation with industry, will enable rapid innovation and delivery of combat system improvements to the fleet.

The Department continues to aggressively pursue affordable systems that are employable from multiple platforms. By leveraging the investment in AMDR, the Navy plans to replace the AN/SPY-1 D(V) radar on select existing DDG 51 Flight IIA ships with scaled variants of the AN/SPY-6(V). Additionally, AN/SPY-6(V) EASR variants will become the primary Air Search Radar for aircraft carriers, amphibious ships, and the guided missile frigate. The use of a common core technology and support strategy enables significant life cycle efficiencies in maintenance support, training, and overall cost for the Navy's primary surface ship radars.

Traditional AEGIS development has been aligned to a major new construction or modernization effort. To meet new challenges to our maritime superiority the Navy is transforming the AEGIS development model. Baselines 9 and 10 enable regular updates, without significant modernization efforts and costs, maximizing return on investment. Future growth capacity advantages of the modern computing infrastructure in Baselines 9 and 10 will allow the Navy to continuously field capability across the AEGIS fleet via stable and continuous Capability Packages. The Capability Package model will allow Navy to bring stability to AEGIS development and outpace the threat; delivering capability at regular intervals with predictable cost, and providing the framework for the Integrated Combat System.

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

TACTICAL AVIATION

Carrier Air Wing (CVW)

The current CVW is transitioning to an optimal mix of 4th and 5th Generation strike fighter aircraft necessary to compete with potential adversaries in the 2020's. The Navy is managing 4th Generation F/A-18 inventory requirements through Service Life Modification (SLM) and 5th Generation requirements through F-35C procurement. SLM extends the existing 4th Generation

capacity while adding advanced Block III capability at one-third the cost of new procurement F/A-18 aircraft. The active F-35C production line and the F/A-18E/F SLM effort are the critical levers for the Navy to manage strike-fighter inventory into the 2030s, ensuring the service maintains the capacity required to meet Global Force Management (GFM) demand while investing in the new technologies required to win in the great-power competition.

The Navy remains committed to the accelerated development of the Next Generation Air Dominance (NGAD) Family of Systems (FoS) and other key aviation wholeness investments. This decision ensures the CVW will maintain capable strike fighter capacity to pace the most stressing threat through the 2030s. NGAD FoS supports increased lethality and the CNO Navigation Plan by providing advanced carrier-based power projection within the CVW and maintaining CVN relevance in contested threat environments. In FY 2021, Navy's Next Generation Fighter program (F/A-XX) begins the Concept Refinement Phase. During this phase, iterative collaboration will occur between Government and industry teams leading to the development of vendor concepts that balance advanced air dominance capabilities and long-term affordability.

With a primary focus of increasing the lethality of the CVW and associated weapons capabilities, the Navy is investing in enhancements for both F/A-18 and F-35. These enhancements include increasing F-35C internal weapons bay capacity by 40 percent and the integration of AARGM-ER. Additionally, Infrared Search & Track (IRST) improvement for F/A-18E/F will bring critical out-of-band detection and weapon-quality-track capability. Delivering 4th and 5th Generation transformational capabilities to front-line forces as soon as possible remains a top priority.

AIRBORNE ELECTRONIC ATTACK (AEA)

The EA-18G Growler is a critical enabler for the Joint force, bringing fully netted electronic warfare capabilities to the fight and providing essential capabilities in the Electromagnetic Maneuver Warfare environment. Next Generation Jammer (NGJ) pods will augment and eventually replace the legacy ALQ-99 pods on the EA-18G and provide full spectrum integrated non-kinetic effects. The delivery of Next Generation Jammer (NGJ) increases EA-18G Growlers lethality and provides a multi-generational leap in capability against radar and

communication targets utilizing advanced AEA techniques as well as improved reliability and maintainability.

Next Generation Jammer-Mid-Band (NGJ-MB) Engineering & Manufacturing Development (EMD) phase is focused on the development and delivery of test pods for ground and flight test activities, as well as the continued build of 6 System Demonstration Test Articles (SDTA). Next Generation Jammer Low Band (NGJ-LB) had a successful Milestone B event and awarded an EMD contract in December 2020, which includes eight operational prototypes.

AIRBORNE COMMAND AND CONTROL AIRCRAFT

The E-2D Advanced Hawkeye (AHE) is the Navy's carrier-based Airborne Command and Control aircraft, equipped with advanced sensors and networking equipment enabling airborne multi-domain command & control, sensor awareness, combat identification, and network connectivity required by Naval and joint force commanders to provide air and sea superiority, and counter adversaries Anti-Access and Area Denial strategies. The E-2D provides unique Theater Air and Missile Defense capabilities, and is a cornerstone of the Naval Integrated Fire Control system of systems linking Navy and Marine Corps fighter aircraft, Navy surface combatants, and Marine Corps ground units.

This year the program will take delivery of five aircraft. In the fourth year of a five year, 27 aircraft MYP contract, the FY 2022 budget requests $884.9 million in APN for five aircraft and Advance Procurement for FY 2023 aircraft. The FY 2022 budget also requests $386.9 million in RDT&E to continue development, integration, and test efforts to outpace the evolving threat. Modernization priorities include Hawkeye Cockpit Technical Refresh, Theater Combat ID and National Technical Means integration, Naval Integrated Fire Control development and test, ALQ-217 Electronic Support Measures updates, Cyber Protection, Secret Internet Protocol Router chat, Counter Electronic Attack, Multifunctional Information Distribution System/Joint Tactical Radio with Tactical Targeting Network Technology, Sensor Netting, Cooperative Engagement Capability (CEC) Signal Data Processor (SDP) and Data Fusion.

ASSAULT SUPPORT AND LOGISTICS SUPPORT AIRCRAFT

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

Marine Corps MV-22 Ospreys currently have a continuous presence in INDOPACOM, CENTCOM, and EUCOM. The Marine Corps has a requirement to procure 20 additional aircraft through the MYP (FY 2018-2022). The MV-22 Common Configuration-Readiness and Modernization (CC-RAM) is executing, and while still early in the program, yielding improved readiness rates. The FY 2022 budget requests $90.0 million in RDT&E for continued MV-22B development and product improvements, including a revolutionary capability (Helmet Mounted Display/Degraded Visual Environment (HMD/DVE)) to improve pilot situation awareness and safety in degraded visual environments; $458.7 million in APN for five MV-22s and long-lead materials; and $300.1 million for modifications, of which $150.6 million is for CC-RAM.

The Navy is continuing development of Carrier On-board Delivery mission aircraft, leveraging MV-22 investment to recapitalize the legacy C-2 fleet with CMV-22B tilt-rotor aircraft. CMV-22B's first flight occurred in December 2019 and the aircraft transitioned into developmental test in January 2020. The program is currently in operational test leading to IOC and its first deployment in the fourth quarter of FY 2021. The FY 2022 budget requests $18.0 million in RDT&E for continued development, testing, and product improvements; $293.0 million in APN for three CMV-22Bs and long-lead materials; and $12.7 million for readiness and interoperability improvements.

FY 2022 will be the last year of V-22 procurement and Bell Boeing intends to initiate V-22 production line shutdown activities if no additional V-22 orders are received. This will bring the Marine Corps' MV-22 procurement to 355 aircraft and Navy's CMV-22 procurement to 44 aircraft.

CH-53K

As the only fully marinized heavy lift helicopter in the DoD, the CH-53K supports both current and future warfighting concepts by providing agile maritime logistical connectors with greater payloads and speed than any current or emerging rotorcraft. The CH-53K contributes to a more lethal joint force by enabling forces to rapidly transition from contact to blunt layer activities -- and back again. In the past year, the CH-53K program has demonstrated significant progress in executing development and flight test activities, continued training of aircrew and maintainers at

the Marine Corps' operational test and evaluation squadron, VMX-1, and continued Low Rate Initial Production. To date, the CH-53K has flown nearly 2,300 developmental flight test hours and is nearing completion of all test activities in support of operational testing. Notably, the fire suppression system uses a more ecologically friendly
HFC-125 suppressant, a technical milestone only a few other Department of the Navy platforms have achieved. The program is well positioned to begin Initial Operational Test and Evaluation (IOT&E) this summer. During FY 2022, the program will complete IOT&E and Live Fire Testing, continue to expand the CH-53K's envelope through ground and flight testing and analysis, and procure the sixth Low Rate Initial Production Lot.

The FY 2022 President's Budget requests $256.9 million in RDT&E to continue the CH-53K development and test, and $1.5 billion in APN for procurement of nine low rate initial production aircraft, including advanced procurement and initial spares.

EXECUTIVE SUPPORT AIRCRAFT

The FY 2022 President's Budget requests $45.9 million in RDT&E and $40.3 million of APN for the H-92A Presidential Helicopter Replacement Aircraft. RDT&E funding is required for Follow-On Test and Evaluation activities and improvements. These efforts include Mission Communications System upgrades (both software and hardware), enhancements to required Wide Band Line Of Sight capabilities, cockpit upgrades, shipboard interoperability, maintaining test aircraft and facilities; as well as, initiates test and evaluation efforts for distributed network communications, and vehicle performance enhancements. APN in the amount of $40.3 million is required for retrofit modifications for the incorporation of the of the Federal Aviation Administration mandated Automatic Dependent Surveillance Broadcast Out system capability, upgrades to the Mission Communication System servers, and shipboard interoperability.

FIXED-WING AIRCRAFT

KC-130J (USMC)

The KC-130J remains a force multiplier for deployed Marine Air-Ground Task Force (MAGTF) success, bringing increased capability, performance, and survivability with lower operating and sustainment costs. The KC-130J is in high demand as it provides tactical air-to-air

refueling and organic lift capabilities to deployed Marine Expeditionary Units and future Marine Littoral Regiments. The FY 2022 budget requests $588.9 million in APN to procure six KC-130Js through an Air Force contract. This request supports a fourth Marine Corps active-duty squadron that will be postured in the Indo-Pacific region.

TAKE CHARGE AND MOVE OUT (TACAMO)

The Navy's TACAMO nuclear command, control and communications (NC3) mission, flown today on the E-6B Mercury (Boeing 707) aircraft, provides communications to the nuclear triad through all phases of a nuclear conflict. In FY 2022, the Navy will accelerate recapitalization of this vital NC3 mission from the aging fleet of 16 E-6Bs onto the C-130J-30 (stretched Super Hercules) aircraft. Funding in FY 2022 includes $60.1 million of RDT&E for non-recurring engineering and long-lead procurement for three C-130J-30 test aircraft and $58.7 million of RDT&E for mission systems design and development. Recapitalization of the TACAMO mission on the C-130J leverages a proven platform for integration of mature TACAMO capabilities, supporting U.S. nuclear deterrence and *Columbia's* assured second strike for decades to come.

MARITIME PATROL AIRCRAFT

The P-8A Poseidon combines the proven reliability of commercial 737 airframes with modern avionics, military communications, and advanced sensors and weapons to provide a range of advanced warfighting capabilities. P-8A capabilities include full-spectrum, wide area, cue-to-kill Anti-Submarine Warfare; Anti-Surface Warfare; and networked Intelligence, Surveillance, and Reconnaissance (ISR). The P-8A program will complete the replacement of the legacy P-3C Orions, and P-8A squadrons now deploy continuously to all areas of the globe to maintain United States maritime dominance, freedom of maneuver, and access to sea-lanes supporting global commerce.

The warfighting requirement is 138 aircraft, including U.S. Naval Reserve squadrons and quick reaction capable aircraft, with 128 aircraft funded. Boeing intends to initiate P-8A production line shutdown activities in FY 2022 if no additional P-8A orders are received. As of April 30, 2021, 106 US aircraft have been delivered.

Since inception, the P-8A has consisted of three Increments. Increments 1 and 2 have fielded and Increment 3 is scheduled to IOC in FY 2025. Increment 3, which consists of ECP 6 and ECP 7, increases ASW capabilities including ASW Signal Intelligence (SIGINT), Wideband SATCOM, Higher-Than-Secret (HTS) processing, enhanced track management and sensor fusion (Minotaur), and Enhanced Multi-Static Active Coherent (MAC-E). P-8A test aircraft began the ECP 6 modification in April 2021 to support developmental and operational testing beginning in FY 2022. ECP 7 encompasses advanced algorithms to the acoustic processors, software improvements, and MAC-E sonobuoy improvements. The FY 2022 request includes $201.1 million in RDT&E for integration of ECP 6 and ECP 7 to complete baseline capability fielding, and rapid development efforts for evolving threats, and $175.9 million in APN for fleet modification kits, deficiency corrections, safety upgrades, and production line shutdown activities. P-8A incremental upgrades ensure the Navy paces the undersea threat and supports distributed net-centric maritime operations.

UNMANNED AIRCRAFT SYSTEMS (UAS)

Consistent with DMO, Naval Aviation fully supports the continued integration of unmanned systems into the Fleet to enable a fundamental shift in the way the DON conducts naval aviation operations. Advantages for continuing and broadening unmanned aviation efforts include decreased risk to personnel, greater persistence, longer ranges, improved data speed and accuracy, and a faster decision cycle. These capabilities offer the DON increased asymmetric operational opportunities and tactical advantages that provide the warfighters an edge to dominate and win in ongoing and future conflicts.

Naval Aviation has successfully deployed a variety of unmanned aircraft systems (UAS) to the Combatant Commanders. For example, MQ-4C and MQ-8B/C UASs are deployed and in operation with the Navy, and the Marine Corps is increasing operational requirements with the MQ-9A Reaper as the Marine Corps shifts focus to the INDOPACOM region. The DON continues to mature the concept of employment of these systems as we fly, integrate and increase quantities into the Navy/Marine Corps Fleet. Of note, reliability, maintainability and availability of UASs are comparable to manned platforms, and we continue to collaborate with our industry partners to increase readiness and lower overall sustainment costs.

Naval Aviation is continuing the development of new unmanned aviation capabilities.

The MQ-25 UAS will provide a critical organic aerial refueling capability to the Carrier Air Wing (CVW) and extend the CVW mission effectiveness range, increase the number of F/A-18E/Fs available for the strike fighter mission by relieving F/A-18E/Fs from the refueling mission, and mitigate future strike fighter and organic CVW ISR shortfalls.

The Marine Corps will sundown the RQ-21 Blackjack (Group 3 UAS), and future operating concepts will focus on Group 2 and Group 5 operations. The Marine Corps has identified the MQ-9A UAS (Group 5) as the materiel solution for the Marine Air-Ground Task Force Unmanned Expeditionary – Medium Altitude Long Endurance (MUX MALE) capability. The Marine Corps seeks to procure six MQ-9A Extended Range systems in FY 2022, and a total of 18 systems over the next several years, to form three UAS squadrons. The Marine Corps will leverage prior existing Air Force and Marine Corps efforts to reduce risk, while providing advanced capabilities to the Marine Corps and overall joint warfighting enterprise. These squadrons will provide persistent airborne data relay in support of overall maritime domain awareness and command and control capabilities. The MQ-9A Extended Range is a critical enabler to the Naval force in building an alternate Precision, Navigation, and Timing network.

The Naval Special Warfare (NSW) command will continue to operate the RQ-21 Blackjack as their organic UAS with SOF peculiar payloads to avoid a capability gap until the next generation small tactical UAS (STUAS) is fielded in FY 2026. The NSW is coordinating with the Marine Corps to leverage the supply chain from the sundown of the Marine's RQ-21 program.

Manned/unmanned teaming development efforts currently underway include the development of CONOPS/Concepts of Employment for integrated operations of and development of a common control architectures and common standard interfaces and protocols. MQ-25 is currently leading many of our current manned/unmanned teaming efforts via the development and maturation of complex sea-based C4I UAS technologies and software algorithms that pave the way for future multi-mission UASs to keep pace with emerging threats. Towards that end, we also envision MQ-4C teaming with P-8A and MQ-8C teaming with MH-60S rotary-wing platforms.

DON unmanned programs are proceeding on a steady course and speed. The DON has successfully developed/employed a number of new unmanned technologies and systems, observed the operational benefits of UASs in not only combat but also drug interdiction, logistics, and day-to-day operations. We see a future where further investment and maturation in

unmanned air system is not only practical – but essential to addressing the Nation's current and future threats and needs.

WEAPONS PROGRAMS

Missile Programs

As the Navy carefully manages the approach to end of life of *Ohio* class SSBNs, addressing the viability of the SWS throughout the life of the *Columbia* class SSBNs remains a priority. The currently deployed TRIDENT II Life Extended (D5LE) missiles will support initial load–outs on *Columbia*, but production of additional D5LE missiles is not practical due to technological obsolescence and lack of an industrial base. The missiles cannot be extended due to the expiration of critical safety components. A modernization of the D5LE SWS, TRIDENT II D5 Life Extension 2 (D5LE2), is required to support later *Columbia* class missile inventory and seamlessly sustain USSTRATCOM requirements. D5LE2 will ensure the SWS will be flexible and adaptable in order to maintain demonstrated performance and survivability despite facing a dynamic threat environment until *Columbia* end of life. The FY 2022 budget includes D5LE2 development efforts to modernize the Submarine Launched Ballistic Missile design and industrial base whose production lines were shut down over the last decade.

SM-6 missiles provide theater and high value target area defense for the Fleet, and with Integrated Fire Control, has more than doubled its range in the counter-air mission. The Navy awarded a five-year MYP contract for up to 625 SM-6 missiles in December 2019. The FY 2022 President's budget continues funding for the upgraded SM-2 Block IIIC as a rapid prototyping project exercising middle tier acquisition authorities and prepares the program for a rapid fielding decision. SM-2 Block IIIC leverages investments made in SM-6 Block I and Evolved Sea Sparrow Missile (ESSM) Block II to enhance performance against numerous threats and to increase depth of fire. The SM-6 Block IB program completes design and continues integration and test efforts to field a cost-effective extended range capability in response to Joint, Fleet and Navy Urgent Operational Needs by integrating a new government developed rocket motor onto an existing SM-6 Block 1A seeker.

ESSM provides another layer to the Navy's defensive battle-space. ESSM Block 2 is in Low Rate Production on track and plans to achieve IOC in early FY 2022. The inner layer of the

Fleet's layered defense is the Rolling Airframe Missile designed to pace the evolving anti-ship cruise missile threat and improve performance against complex engagement scenarios.

Strike Weapons

The Department continues to support a wider, more systematic approach towards delivering offensive weapons balance. By preserving the readiness and capacity of our key strike weapons inventories, pursuing strike weapon capability enhancements, and developing next-generation strike missile capabilities, the DON will increase overall force effectiveness to address emerging threats.

Tomahawk

In the FY 2022 budget request, the Department sustains the Tomahawk as the nation's premier all-weather, long-range, survivable deep strike offensive weapon to include new production and recertification of current inventory. For Maritime Strike Tomahawk (MST), the FY 2022 budget request provides continuation of initial shipboard and shore-side mission planning and funds software builds to support first test of all MST system segments at NSWC in the first quarter of FY 2022. FY 2022 MST Test and Evaluation (T&E) plans include missile functional ground testing and missile test flights from a ground launcher apparatus to assess seeker performance, mature and refine seeker algorithms, and provide verification and validation data for Modeling and Simulation. MST IOC is planned for the FY 2024.

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

OASuW Increment 1/LRASM provides Combatant Commander the ability to conduct ASuW operations against near/mid-term high-value surface combatants protected by Integrated Air Defense Systems with long-range Surface-to-Air-Missiles and to deny adversaries sanctuary of maneuver. The program achieved Early Operational Capability on the Air Force B-1B in early FY 2019 and on the Navy's F/A-18E/F aircraft in early FY 2020. The FY 2022 President's Budget Continuation of and completion of USN LRASM 1.1 development, which will deliver incremental upgrades to keep pace with emerging threat capability and increase in LRASM quantities through the FYDP.

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

AARGM procurement completed in FY 2021 with deliveries continuing through FY 2024 in support of the transition to AARGM-ER. AARGM-ER provides the Department of the Navy with a 5th Generation compatible extended range asset to project power and provide Suppression of Enemy Air Defenses, both at-sea and on land. There have been 1218 AARGMs (All Up Rounds, Training Missiles, and Spares) delivered to the Fleet (as of 26 May 2021). Program of record delivery is 1803 missiles. The FY 2022 President's Budget supports an AARGM-ER ramp in production through FYDP and supports transition into system-level developmental testing and operational testing of production representative hardware.

Hypersonic Program

The Navy Conventional Prompt Strike (CPS) Program Office is developing a hypersonic weapon system that will enable precise and timely strike capability against deep inland targets in contested environments. CPS and the Army Hypersonics Project Office are jointly leveraging a common missile design and test opportunities to field a non-nuclear hypersonic weapon system. The Navy plans to make USS *Zumwalt* the first Navy platform to field hypersonic capability, currently planned for the mid-2020s. In March 2020 the Services executed a highly successful flight test of the Common Hypersonic Glide Body (C-HGB), and in late May successfully conducted a test of the First Stage Solid Rocket Motor (SRM). All Up Round testing is scheduled for FY 2022. This rapid development and demonstration of hypersonic strike weapons systems supports the U.S. ability to deter, and if necessary, defeat potential adversaries.

Directed Energy

In FY 2020, the Navy provided Congress its path forward for shipboard integration of High Energy Laser systems and the risk reduction plan to continue to improve technology while growing the industrial base for these systems. Initial capabilities, such as Solid State Laser-Technology Maturation (SSL-TM) on USS *Portland* (LPD 27), continue to be valuable for shipboard experimentation and integration to inform the Navy's long term consideration of other ship classes as host platforms for laser weapons. In the FY 2022 budget request, the Department will further advance capabilities of laser weapons to meet ship defense missions and will install and field the first fully combat system integrated laser weapons system, HELIOS, onboard a DDG

51 Flight IIA destroyer. The Department is also collaborating and partnering with the DoD and other Services to continue to mature these advanced laser technologies to defeat more challenging threats to support and shape the future acquisition of these systems.

Counter Unmanned Aircraft Systems (C-UAS)

The Navy continues implementation of integrated C-UAS solutions designed to protect high value and critical naval assets afloat and ashore as well as provide basic defensive measures at priority shore installations against the threats posed by unmanned aircraft systems. Our efforts focus on maintaining commonality of current C-UAS solutions while rapidly evaluating, improving and implementing an integrated family of systems to defeat evolving threats afloat and ashore. We are rapidly pursuing refinement of material solutions, threat-based mission assessments, and development of advanced target discrimination and defeat capabilities while continuing installation, integration, improvement, and sustainment of C-UAS capabilities worldwide. We continue engaging with the Army in their role as Executive Agent (EA) for counter small unmanned aircraft systems (C-sUAS) to develop and execute a deliberate, repeatable process to identify prioritized areas for investment and focuses for development. Additionally, in partnership with the C-sUAS EA, we are refining an open architecture solution and interoperability standards as well as identifying or developing additional detect and deter capabilities to integrate into the C-UAS family of systems.

MARINE CORPS GROUND PROGRAMS

The Marine Corps' ground programs are a vital contribution to the integrated Naval and Joint force that can achieve success in both maritime gray zone competition and traditional conflict. The Marine Corps is developing ground-based, long-range precision fires as an anti-ship capability to contribute to Distributed Maritime Operations. Additionally, the Marine Corps will provide intelligence and communication capabilities on a daily basis, enabled through a system of sensors and communication networks, which will be employed by our Marine Littoral Regiments.

Long-Range Precision Fires

As the Nation's Stand-In force, the Marine Corps is uniquely suited to provide precision fires from land-to-sea in the prosecution of naval campaigns. While this is a significant change

from the past two decades of land-based operations, we are implementing this change to maximize the Marine Corps' deterrent and combat capabilities in support of future naval campaigns. Simultaneously, we retain our national crisis response force capability.

Ground-Based Anti-Ship Missile (GBASM)

GBASM is the Marine Corps' top modernization priority and is the key lethality component for the Marine Corps to facilitate sea denial in support of naval and joint operations. The current materiel solution for GBASM is the Navy-Marine Expeditionary Ship Interdiction System (NMESIS) which consists of two Naval Strike Missiles mounted on a remotely operated JLTV-based chassis. The capability creates cost impositions for an adversary by introducing a new and highly credible threat into their decision-making, while providing us with a relatively low cost and highly effective capability.

By combining existing technologies in the missile and the platform, the Marine Corps has reduced programmatic risks through the use of proven capabilities, which enables us to move faster. The Marine Corps successfully tested this system in November 2020, and in our FY 2022 budget request, we are seeking funding for 10 test systems for further developmental and operational testing. With the ability to strike enemy ships at ranges of 100 nautical miles and beyond, we believe it will be a "game changer" for the Marine Corps, the Naval Fleet Commander, and combatant commanders.

Organic Precision Fires (OPF)

OPF is a family of loitering munition systems that will provide multiple echelons of the Fleet Marine Force with beyond-line-of-sight, precise fires capabilities. As a "hunter – killer" capability, OPF will provide continuous surveillance before, during, and after conducting lethal strikes against targets, while reducing potential for collateral damage. Furthermore, these systems will be capable of engaging targets at extended range with sufficient lethality to defeat armored, water-borne, and personnel threats.

Long-Range Unmanned Surface Vessel (LRUSV)

The Marine Corps envisions LRUSV as an uncrewed vessel, approximately 45 feet in length, capable of conducting semi-autonomous maneuver in the open ocean for extended periods

of time. The vessel will serve as a platform for the launching of Organic Precision Fires, thus providing reconnaissance and surface-launched strike capabilities. Through extensive wargaming, the LRUSV has demonstrated the potential to generate significant operational impact, benefitting the Navy and Marine Corps' anti-surface warfare campaigns. The Marine Corps is taking a deliberate approach to capability development using prototyping and experimentation to reduce technical and integration risk, validate designs, and better inform achievable and affordable requirements, with the ultimate goal of delivering capabilities to the Marine Corps and Joint Force in the mid- to late-2020s. The Marine Corps has already contracted for three prototypes, and with our FY 2022 budget request, we will seek to procure two additional prototype vessels to begin experimentation.

Resilient Sensors and Communication Networks

To enable naval and joint force commanders across the competition continuum, the Marine Corps must not only become lighter and more lethal, but also must enhance its ability to enable joint command and control, as well as reconnaissance and counter reconnaissance operations. Thus, the Marine Corps is working on more resilient and interoperable networks and data systems that will support Marines' sensing and communication capabilities, enabling the Navy Tactical Grid and Joint All-Domain Command and Control. This creates advantages for Marines across key maritime locations and provides the required information for uniformed and civilian leaders to make sound judgments.

Ground/Air Task Oriented Radar (G/ATOR)

G/ATOR is a state-of-the-art, ground-based, short-to-medium range, expeditionary radar system designed as a single materiel solution to satisfy air surveillance, air defense, ground counter-fire and counter-battery, with the ability to perform air traffic control mission sets. The radar is transportable by organic Marine Corps means. G/ATOR enables Marines to control designated airspace by way of detecting, tracking, classifying, and accurately determining the origin of enemy projectiles and air threats. Notably, G/ATOR will support forward-postured Marines by providing surveillance and detection of enemy air threats, not easily identified by other radar assets in congested littoral environments. The G/ATOR radar is already in service in the Pacific region, and the Marine Corps will continue to procure and field this highly capable radar

system. In addition to G/ATOR, the Marine Corps is developing the Multi-Domain Radar for a Contested Environment (MuDRaCE). This advanced system is complementary to the G/ATOR and will enhance the Marine Corps and Joint Forces' situational awareness.

Marine Electronic warfare Ground Family of Systems (MEGFoS)

MEGFoS is an electronic warfare system that serves to counter improvised explosive devices and unmanned aerial surveillance threats while also providing limited counter-communications capabilities. This family of systems, which includes mounted and dismounted variants, is in development. Through the use of the electro-magnetic spectrum, MEGFoS will have the ability to locate and identify adversary forces while simultaneously providing friendly forces feedback on their signature management operations. MEGFoS will enable the Marine Corps to maneuver, fight, and sustain itself through the exploitation of the electro-magnetic spectrum.

Network On The Move (NOTM)

NOTM is comprised of a robust communication system mounted on a ground combat vehicle or aviation platform. NOTM provides terrestrial line-of-sight and beyond line-of-sight satellite communications for Marines at-the-halt and while on-the-move. NOTM is purpose built to support our naval and joint concepts that require our forces to fight in a distributed manner by allowing dispersed commanders the ability to effectively command and control forces in a contested all-domain environment. The Marine Corps is currently fielding these systems that will allow for seamless command and control for maneuvering units in the future.

Next Generation Satellite Communications

Marine Corps Wideband Satellite Communications Family of Systems (MC-WSATCOM FoS) is a comprehensive, integrated, and sustainable solution designed to address current and future warfighting capability needs using military and commercial SATCOM systems in both contested and permissive electro-magnetic spectrum environments. The MC-WSATCOM FoS will replace legacy very-small-aperture terminal communications systems, enable command and control of forward postured Marines, and be fully interoperable with naval and joint wideband SATCOM systems.