

DIVISION A—DEPARTMENT OF DEFENSE AUTHORIZATIONS

TITLE I—PROCUREMENT

Subtitle A—Authorization of Appropriations

Authorization of appropriations (sec. 101)

The committee recommends a provision that would authorize the appropriations for procurement activities at the levels identified in section 4101 of division D of this Act.

Subtitle B—Army Programs

Sense of Senate on Army’s approach to capability drops 1 and 2 of the Distributed Common Ground System-Army program (sec. 111)

The committee recommends a provision that would express the Sense of the Senate on the Army’s approach to capability drops one and two of the Distributed Common Ground System-Army program.

Authority of the Secretary of the Army to waive certain limitations related to Distributed Common Ground System-Army Increment 1 (sec. 112)

The committee recommends a provision that would amend section 113(d) of the National Defense Authorization Act for Fiscal Year 2017 (Public Law 114–328) by striking “Secretary of Defense” and inserting “Secretary of the Army.”

The waiver process for capability drops into the Distributed Common Ground System-Army system architecture is overly time-consuming. Capability drop one required over 12 months of processing time for approval. These delays slow progress and ultimately degrade the warfighter’s ability to analyze and act on time-sensitive intelligence.

Therefore, the committee recommends that the waiver authority be given to the Secretary of the Army for faster processing and approval.

Subtitle C—Navy Programs

Modification of prohibition on availability of funds for Navy port waterborne security barriers (sec. 121)

The committee recommends a provision that would amend section 130 of the John S. McCain National Defense Authorization Act for Fiscal Year 2019 (Public Law 115–232) to extend the prohibition on availability of funds for Navy port waterborne security bar-

riers through fiscal year 2020 and would require the Secretary of the Navy to notify the congressional defense committees if exigent circumstances, under which an exception is granted, are deemed to exist.

Capabilities based assessment for naval vessels that carry fixed-wing aircraft (sec. 122)

The committee recommends a provision that would require the Secretary of the Navy to conduct a capabilities-based assessment to clarify the future requirements for naval vessels that carry fixed-wing aircraft.

The committee notes that the budget request’s proposal to retire the USS *Harry S. Truman* (CVN-75) early would yield a force with 10 or fewer aircraft carriers for more than 20 years. The budget request also includes a 7-year gap until the funding of the next amphibious assault ship, LHA-9, which will likely result in a production break. The committee is concerned that both the CVN-75 and LHA-9 proposals are contrary to current Navy force structure requirements and will result in significant negative impacts for the shipbuilding industrial base.

The committee also notes that the Under Secretary of the Navy stated in February 2019, “If \$13 billion is unaffordable . . . what’s the next carrier look like? Is it going to be as advanced as [the USS *Gerald R. Ford*] or is it going to be smaller? . . . We don’t know the answers to that, but we’re looking at those.”

The committee also notes that all three future fleet platform architecture studies required by section 1067 of the National Defense Authorization Act for Fiscal Year 2016 (Public Law 114-92) recommended that the Navy pursue a class of aircraft carriers smaller than the *Ford*-class. The committee believes that smaller aircraft carriers could both increase aircraft carrier capacity and provide a more efficient means to conduct a range of missions with lower sortie requirements, including support for amphibious operations.

Accordingly, the committee directs the Secretary of the Navy to consult the fleet architecture studies, as well as the report on alternative aircraft carrier options required by section 128 of the National Defense Authorization Act for Fiscal Year 2016 (Public Law 114-92), and initiate a capabilities-based assessment to begin the process of identifying requirements for the naval vessels that will carry fixed-wing aircraft following CVN-81 and LHA-9.

Ford-class aircraft carrier cost limitation baselines (sec. 123)

The committee recommends a provision that would establish *Ford*-class aircraft carrier cost limitation baselines in title 10, United States Code, and repeal a superseded provision.

The committee notes that cost limitation baselines for *Ford*-class aircraft carriers were first enacted in section 122 of the John Warner National Defense Authorization Act for Fiscal Year 2007 (Public Law 109-364). These cost limitation baselines have been amended in public law three times to account for cost estimate adjustments. The committee further notes that the Secretary of the Navy raised the cost limitation baseline for the CVN-78 to \$13.0 billion in May 2018.

The committee believes that *Ford*-class cost limitation baselines should now be adjusted to reflect the Navy's latest cost estimates for each of the four ships in the class and that the cost limitation baseline for each such ship should be codified in title 10, United States Code, due to the long-term nature of aircraft carrier construction and the benefits of greater clarity in oversight requirements.

The provision therefore would: (1) Update the cost limitation baseline for each *Ford*-class aircraft carrier; (2) Require notification of the congressional defense committees at least 30 days prior to the Secretary of the Navy's adjusting a limitation amount; (3) Eliminate adjustments that would be based on non-recurring engineering changes that are no longer applicable; and (4) Eliminate reporting requirements related to CVN-79, which would be maintained elsewhere.

Design and construction of amphibious transport dock designated LPD-31 (sec. 124)

The committee recommends a provision that would authorize the Secretary of the Navy to enter into and incrementally fund a contract for design and construction of the amphibious transport dock designated LPD-31.

The committee notes that in testimony before the Senate Armed Services Committee on April 7, 2019, the Secretary of the Navy and Chief of Naval Operations supported incremental funding authority for LPD-31.

LHA Replacement Amphibious Assault Ship Program (sec. 125)

The committee recommends a provision that would authorize the Secretary of the Navy to enter into and incrementally fund a contract for design and construction of the LHA replacement ship designated LHA-9.

The committee notes that in testimony before the Senate Armed Services Committee on April 7, 2019, the Secretary of the Navy and Chief of Naval Operations supported incremental funding authority for LHA-9.

The provision would also repeal section 125 of the John Warner National Defense Authorization Act for Fiscal Year 2007 (Public Law 109-364).

Limitation on availability of funds for the Littoral Combat Ship (sec. 126)

The committee recommends a provision that would prohibit funds from being used to exceed the total procurement quantity listed in revision five of the Littoral Combat Ship (LCS) acquisition strategy unless the Under Secretary of Defense for Acquisition and Sustainment submits to the congressional defense committees a certification.

The committee notes that the Navy force structure assessment requirement and LCS acquisition strategy total procurement quantity of 32 LCSs was met in fiscal year 2018. Three additional LCSs were authorized and appropriated by the Congress in fiscal year 2019.

Accordingly, the provision would require that, before further LCS procurement, the Under Secretary of Defense for Acquisition and Sustainment certify to the congressional defense committees that such procurement: (1) Is in the national security interests of the United States; (2) Will not result in exceeding the low rate initial production quantity approved in the LCS acquisition strategy in effect at the time of the certification; and (3) Is necessary to maintain a full and open competition for the guided missile frigate (FFG(X)) with a single source award in fiscal year 2020.

Limitation on the next new class of Navy large surface combatants (sec. 127)

The committee recommends a provision that would require that design changes identified during the full duration of the combat system ship qualification trials and operational test periods of the first *Arleigh Burke*-class destroyer in the Flight III configuration be incorporated prior to Milestone B approval for the next new class of Navy large surface combatants.

The provision would also require that the final results of test programs of engineering development models or prototypes be incorporated into the Navy large surface combatant program prior to Milestone B approval.

Refueling and complex overhauls of the USS John C. Stennis and USS Harry S. Truman (sec. 128)

The committee recommends a provision that would require the Secretary of the Navy to carry out the nuclear refueling and complex overhaul of the USS *John C. Stennis* (CVN-74) and USS *Harry S. Truman* (CVN-75).

The provision would also authorize the use of incremental funding for a period not to exceed 6 years after advance procurement funds for each nuclear refueling and complex overhaul effort are first obligated.

The committee notes that in testimony before the Armed Services Committee of the Senate on March 14, 2019, the Acting Secretary of Defense stated, “[The proposal not to refuel the USS *Harry S. Truman*] represents some of the strategic choices that we’ve made in this year’s budget. . . . The funds we freed up from making these decisions are invested in the future force.” The committee understands that this desired future force includes offensively armed unmanned or optionally-manned surface vessels, for which the budget request includes more than \$2.7 billion to procure in fiscal years 2020 through 2024.

While recognizing the need to modernize the U.S. military to support the National Defense Strategy, the committee has not received adequate justification to support a shift in funding from refueling an aircraft carrier to procuring unproven systems. Specifically, the committee is unaware of: a new joint warfighting plan that concluded that the Nation needs one fewer aircraft carrier; proven substitute capabilities for the combat power and reach of the *Truman* and its air wing; unmanned surface and undersea systems proven to be operationally effective and suitable in the threat environment; or a change in the Chief of Naval Operations’ requirement for 12 aircraft carriers.

The committee is also unaware of administration proposals to change section 8062 of title 10, United States Code, which requires the Navy to maintain not fewer than 11 operational aircraft carriers, or section 1025 of the National Defense Authorization Act for Fiscal Year 2018 (Public Law 115–91), which made it the policy of the United States to achieve a 355-ship Navy comprised of the “optimal mix” of ships as soon as practicable. The “optimal mix” is defined as the mix of ships in the Navy’s 355-ship requirement, including 12 aircraft carriers.

The committee also notes that the Department of Defense estimates that not refueling the *Truman* would save approximately \$3.5 billion plus annual operating costs. The committee is unclear as to how these savings compare to the development, procurement, and annual operating costs of the systems that are envisioned to provide equivalent or better capability as compared to the *Truman* and its air wing. The committee is also unaware of the schedule necessary to field such systems.

Additionally, the committee notes that the Navy’s “Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020” states, “Unmanned and optionally-manned systems are not accounted for in the overall battle force[.] . . . The physical challenges of extended operations at sea across the spectrum of competition and conflict, the concepts of operations for these platforms, and the policy challenges associated with employing deadly force from autonomous vehicles must be well understood prior to replacing accountable battle force ships.” The committee does not believe that this standard has been met regarding the budget request’s *Truman* proposal.

Report on carrier wing composition (sec. 129)

The committee recommends a provision that would direct the Secretary of the Navy to submit a report to the congressional defense committees, no later than May 1, 2020, on the optimal composition of the carrier air wing in 2030 and 2040, as well as alternative force design concepts. The provision would also require the Secretary to provide a briefing on the report no later than March 1, 2020, to the congressional defense committees.

The committee is concerned, based on a number of independent analyses, that the Navy’s current stated goal of a 50/50 mix of 4th and 5th generation aircraft for the future carrier air wing will not be sufficient to meet the requirements of the National Defense Strategy.

Therefore, the report required by this provision would include:

- (1) Analysis and justification used to reach the 50/50 mix of 4th and 5th generation aircraft for 2030; (2) Analysis and justification for the optimal mix of carrier aircraft for 2040; and (3) A plan for incorporating unmanned aerial vehicles and associated communication capabilities to effectively implement the future force design.

Subtitle D—Air Force Programs

Requirement to align Air Force fighter force structure with National Defense Strategy and reports (sec. 141)

The committee recommends a provision that would require the Secretary of the Air Force to align the fighter force structure acquisition strategy with the results of the independent studies required by section 1064 of the National Defense Authorization Act for Fiscal Year 2018 (Public Law 115–91) and to transmit the new strategy in a report to the congressional defense committees no later than March 1, 2020. The committee is concerned that the Air Force’s current fighter force structure acquisition strategy does not comport with multiple reports required by the National Defense Authorization Act for Fiscal Year 2018 nor the service’s own stated requirements to meet the National Defense Strategy. The provision would prohibit the Air Force’s deviation from this strategy in its acquisition programs and related force structure until the Secretary of the Air Force receives a waiver and justification from the Secretary of Defense and until 30 days after notifying the congressional defense committees of the proposed deviation.

Requirement to establish the use of an Agile DevOps software development solution as an alternative for Joint Strike Fighter Autonomic Logistics Information System (sec. 142)

The committee recommends a provision that would require the Secretary of Defense to establish an agile software development activity as an alternative for the F–35 Autonomic Logistics Information System (ALIS). The committee is encouraged by the ongoing efforts to incorporate agile software development into the ALIS programs of record (ALIS-next and Madhatter) while also maintaining traditional development in order to avoid risk to the overall program timeline. The provision would separate the budget lines and require a competitive analysis of the efforts between ALIS, ALIS-next, and Madhatter by the Secretary of Defense in order to evaluate transition opportunities and timelines.

Finally, the provision would direct the Secretary of the Defense, in coordination with the Secretary of the Air Force, to brief the congressional defense committees on the findings of the competitive analysis no later than September 30, 2020.

Report on feasibility of multiyear contract for procurement of JASSM–ER missiles (sec. 143)

The committee recommends a provision that would require the Air Force to produce and submit a report assessing the feasibility of entering into a multi-year contract for the procurement of the JASSM–ER. The provision would require the Air Force to examine multiple multi-year contract scenarios, including one in which the Air Force would procure an annual quantity of 550 missiles for 5 years. The committee notes that the Air Force requirement for the JASSM–ER has recently increased. Further, the industrial base has recently expanded the capacity of its production facility to 550 missiles per year in order to meet the increased requirements of the Air Force.

The committee notes that multi-year contracts can provide significant cost savings and stability in funding over multiple years. Therefore, the report would include assessments of the impacts on: the cost of the missile, the industrial base, the Long Range Anti-Ship Missile, and future development or modification requirements for the JASSM-ER.

Air Force aggressor squadron modernization (sec. 144)

The committee recommends a provision that would require the Secretary of the Air Force to submit a report to the congressional defense committees on Air Force aggressor squadron modernization.

Air Force plan for the Combat Rescue Helicopter fielding (sec. 145)

The committee recommends a provision that would require the Air Force to provide a plan on the Combat Rescue Helicopter fielding.

Military type certification for AT-6 and A-29 light attack experimentation aircraft (sec. 146)

The committee recommends a provision that would require the Secretary of the Air Force to conduct a Military Type Certification for AT-6 and A-29 Light Attack Experimentation Aircraft.

Subtitle E—Defense-Wide, Joint, and Multiservice Matters

Limitation on availability of funds for communication systems lacking certain resiliency features (sec. 151)

The committee recommends a provision that would prohibit funding of any current or future Department of Defense (DOD) communications programs of record that do not meet certain resiliency requirements. The committee is concerned that, in the face of great power competition, the DOD has not assured servicemembers' ability to communicate and share data securely and consistently in a contested environment.

The committee defines these program resiliency requirements as features that: 1) Deny geo-location of a transmission that would allow enemy targeting of the force; 2) Securely communicate classified information in a jamming environment of like-echelon forces; and 3) Utilize a waveform that is made available in the DOD Waveform Information Repository.

The committee understands that there may be very limited cases where DOD communications equipment will be used to communicate in a garrison or peacetime situation and not in combat environments. Therefore, the provision would allow the Secretaries of the military departments to waive the aforementioned requirements for a system with a certification that the system does not require resiliency due to its expected use.

F-35 sustainment cost (sec. 152)

The committee recommends a provision that would require the F-35 Joint Program Office (JPO) to provide quarterly sustainment cost data, as part of the JPO quarterly briefings to the congress-

sional defense committees. The committee is concerned that the Department of Defense is making force structure decisions based on sustainment cost data that do not easily provide the user with valid comparable metrics. Therefore, the requested information should compare, in an itemized format, the cost of legacy aircraft to that of the F-35 program based on a standardized set of criteria.

The provision also requires the Under Secretary of Defense for Acquisition and Sustainment to: (1) Develop a plan for achieving significant reductions in the costs to operate and maintain the F-35 aircraft; (2) Submit a report on that plan; and (3) Provide quarterly updates on the progress of implementing the plan.

Economic order quantity contracting authority for F-35 Joint Strike Fighter program (sec. 153)

The committee recommends a provision that would authorize the Secretary of Defense to award F-35 contracts to procure material and equipment in economic order quantities for fiscal year 2021 (Lot 15) through fiscal year 2023 (Lot 17). The committee supports the Department of Defense's planning for a multi-year procurement for production Lots 15, 16, and 17.

Repeal of tactical unmanned vehicle common data link requirement (sec. 154)

The committee recommends a provision that would strike section 141 of the National Defense Authorization Act for Fiscal Year 2006 (Public Law 109-163). The committee is concerned that the standards set in the section 141 requirement do not keep pace with the current high threat environment and is thus out of step with the National Defense Strategy. The repeal would help the Services form an overall architecture for communications that is more resilient and allows for the inclusion and connection of manned and unmanned aircraft and weapons.

Budget Items

Army

Utility fixed wing aircraft

The budget request included \$16.0 million in line number 2 of Aircraft Procurement, Army (APA), for utility fixed wing aircraft. The committee notes that line number 2 of APA for the remainder of the future years defense program contains no funding for the program.

Therefore, the committee recommends a decrease of \$16.0 million in line number 2 of APA for the procurement of utility fixed wing aircraft.

AH-64 Apache Block IIIB New Build

The budget request included \$0.0 million in line number 10 of Aircraft Procurement, Army (APA), for AH-64 Apache Block IIIB New Build.

The committee recognizes the importance of the Army's efforts to modernize and equip both the active component and the Army National Guard with the most advanced and capable attack heli-

copters in support of the National Defense Strategy. Consequently, the Army should field the Block IIIB aircraft as quickly as possible across the 24 attack battalions in the active component and the Army National Guard.

Therefore, the committee recommends an increase of \$105.0 million in line number 10 of APA for the procurement of three AH-64 Apache Block IIIB New Build aircraft.

UH-60M Blackhawk

The budget request included \$1.4 billion in line number 12 of Aircraft Procurement, Army (APA), for 73 UH-60M Blackhawk aircraft.

The committee recognizes the importance of the Army's efforts to field the most advanced and capable utility helicopters in support of the National Defense Strategy. However, the committee is concerned about the utility helicopter industrial base and the dramatic downturn in production of UH-60M aircraft through the proposed future years defense program. Further, the committee believes that the Army should take advantage of the current multiyear contract that will expire in fiscal year 2021 and more equitably distribute procurement to limit a steep production cut from fiscal year 2020 to fiscal year 2021.

Therefore, the committee recommends a decrease of \$140.0 million for 7 active component aircraft in line number 12 of APA for the procurement of UH-60M aircraft.

UH-60V Conversion

The budget request included \$169.2 million in line number 14 of Aircraft Procurement, Army (APA), for UH-60 Blackhawk L and V Models.

The committee recognizes the importance of the Army's efforts to field the most advanced and capable utility helicopters for the Army National Guard in support of the National Defense Strategy. As such, the Army should accelerate the conversion of Blackhawks to the upgraded V model, which provides enhanced situational awareness, as quickly as possible to optimize training and reduce operation and sustainment costs.

Therefore, the committee recommends an increase of \$35.0 million in line number 14 of APA for the conversion of 8 additional UH-60V aircraft.

Interim Indirect Fire Protection Capability Increment 2

The budget request contained \$0.0 million in line number 4 of Missile Procurement, Army, for Indirect Fire Protection Capability (IFPC) Increment 2.

The committee notes that, while the Army in February 2019 issued a letter of intent to procure two batteries of Iron Dome to meet the requirement articulated in section 112 of the John S. McCain National Defense Authorization Act for Fiscal Year 2019 (Public Law 115-232) for an interim cruise missile defense capability, this decision was predicated on submission and approval of an above threshold reprogramming (ATR) by mid-April 2019. Because of the delay in submission of the ATR to the congressional defense committees, the committee is concerned that the Army will

be unable to meet the statutory requirement for interim base defense. Therefore, the committee recommends a realignment that would support procurement of two Iron Dome batteries with fiscal year 2020 funds as well as a realignment elsewhere in this report of research, development, test, and evaluation funding to support the procurement. The committee notes that, should the ATR be fully approved before the end of fiscal year 2019, this realignment would no longer be necessary.

Accordingly, the committee recommends an increase of \$229.9 million in line number 4 of Missile Procurement, Army, for IFPC Increment 2.

Terminal High Altitude Area Defense Army procurement

The budget request did not contain any funding in Missile Procurement, Army, for the Terminal High Altitude Area Defense (THAAD) system.

Elsewhere in this report, the committee has stated its views regarding the transition of the THAAD program from the Missile Defense Agency to the Department of the Army.

Therefore, the committee recommends an increase of \$425.9 million in line number 5 of Missile Procurement, Army.

Stryker lethality

The budget request included \$144.4 million in line number 3 of Weapons & Tracked Combat Vehicles (WTCV), Army, for Stryker modifications.

The Army also identified on its unfunded priority list a shortfall in funding of \$249.2 million in line number 3 of WTCV, Army, to fund Stryker lethality upgrades.

The committee acknowledges the need to increase Stryker lethality with a 30mm gun in order to improve standoff and survivability and retain overmatch in support of the National Defense Strategy.

Therefore, the committee recommends an increase of \$249.2 million in line number 3 of WTCV, Army.

Bradley program

The budget request included \$638.8 million in line number 5 of Weapons & Tracked Combat Vehicles (WTCV), Army, for the procurement of upgrades to the family of Bradley Fighting Vehicles.

The committee strongly supports the Bradley A4 upgrade program, which is essential to ensure that the armored brigade combat team remains relevant for the next 3 decades. However, the committee notes that, according to budget documents provided by the Department of the Army, the program is historically under-executing.

Therefore, the committee recommends a decrease of \$40.0 million in line number 5 of WTCV, Army.

Abrams upgrade program

The budget request included \$1.8 billion in line number 14 of Weapons & Tracked Combat Vehicles (WTCV), Army, for the upgrade of 165 Abrams tanks to the M1A2 SEPv3.

The M1A2 SEPv3 program is vital to the lethality and survivability of the Army's armored brigade combat team. The M1A2 SEPv3 incorporates multiple improvements such as: turret and hull armor upgrades for enhanced crew survivability; the Total Integrated Engine Revitalization program and upgraded transmission for improved power pack reliability and durability; improved computer systems including microprocessors, color flat panel displays, and memory capacity; and Block 1 second generation Forward Looking Infra-Red technology. The committee strongly supports the Abrams Upgrade Program and its alignment to the National Defense Strategy. However, the committee believes that funding could be better balanced throughout the future years defense program to reduce industrial base turbulence.

Therefore, the committee recommends a decrease of \$35.0 million in line number 14 of WTCV, Army.

Joint Light Tactical Vehicle

The budget request included \$996.0 million in line number 6 of Other Procurement, Army (OPA), for the procurement of 2,530 Joint Light Tactical Vehicles (JLTV).

The Army has requested a zero sum realignment of \$4.5 million from line number 6 of OPA to PE 65812A in Research, Development, Test, and Evaluation, Army, in order to complete the developmental portion of the Training, Aids, Devices, Simulators and Simulation Hands-On Trainers requirement for the JLTV.

Therefore, the committee recommends a decrease of \$4.5 million in line number 6 of OPA.

Joint Light Tactical Vehicle

The budget request included \$996.0 million in line 6 of Other Procurement, Army (OPA), for the procurement of 2,530 Joint Light Tactical Vehicles (JLTV).

The JLTV is capable of performing multiple mission roles and is designed to provide protected, sustained, and networked mobility for personnel and payloads across the full range of military operations.

However, the committee believes that the Army should make a full rate production decision as soon as possible. Therefore, the committee recommends a decrease of \$35.0 million in line 6 of OPA.

Q53 extended range radar

The budget request included \$16.4 million in line number 100 of Other Procurement, Army (OPA), for counterfire radars.

The Army identified in its unfunded priority list a shortfall in funding of \$62.5 million in line number 100 of OPA to fund the Q53 extended range radar.

The committee acknowledges the need to improve current radar systems with gallium-nitride technology to extend the range capabilities for indirect fire units in support of the National Defense Strategy.

Therefore, the committee recommends an increase of \$62.5 million to line number 100 of OPA.

Integrated Personnel and Pay System—Army

The budget request included \$18.7 million in line number 109 of Other Procurement, Army (OPA), for the Integrated Personnel and Pay System—Army.

The committee is concerned about unjustified cost growth and poor business process reengineering.

Accordingly, the committee recommends a decrease of \$18.7 million in line number 109 of OPA.

C4I life-cycle replacement at Joint Intelligence Operations Center Europe Analytic Center

The budget request included \$139.3 million in line number 113 of Other Procurement, Army (OPA), for Automated Data Processing Equipment.

The committee recommends an increase of \$8.0 million in line number 113 of OPA to support life-cycle replacement of command, control, communication, computer, and intelligence systems and infrastructure at the Joint Intelligence Operations Center Europe Analytic Center at RAF Molesworth, United Kingdom.

Army contract writing system

The budget request included \$15.0 million in line number 116 of Other Procurement, Army (OPA), for the Army Contract Writing System.

The committee remains concerned about duplication among the Services in contract writing systems.

Accordingly, the committee recommends a decrease of \$15.0 million in line number 116 of OPA.

Robotics and Applique Systems

The budget request included \$101.1 million in line number 138 of Other Procurement, Army (OPA), for Robotics and Applique Systems.

The Army has requested a zero sum realignment of \$12.8 million from PE 65053A within Research, Development, Test, and Evaluation, Army, to line number 138 of OPA for Ground Robotics, Squad Multipurpose Equipment Transport (S-MET) in order to accelerate the production and fielding of the S-MET.

Therefore, the committee recommends an increase of \$12.8 million in line number 138 of OPA.

Navy

F-35C

The budget request included \$2.3 billion in line number 3 of Aircraft Procurement, Navy (APN), for 20 F-35 aircraft.

The committee recognizes the importance of the Navy's and Marine Corps' efforts to modernize and equip themselves with the most advanced and capable aircraft in support of the National Defense Strategy. However, the committee is concerned about the quantity and timing of procurement of fifth generation aircraft and understands that the Chief of Naval Operations has placed additional aircraft on his unfunded priority list.

Therefore, the committee recommends an increase of \$215.0 million in line number 3 of APN for the procurement of 2 additional F-35C aircraft.

F-35B

The budget request included \$1.3 billion in line number 5 of Aircraft Procurement, Navy (APN), for 10 F-35 aircraft.

The committee recognizes the importance of the Marine Corps' efforts to modernize and equip itself with the most advanced and capable aircraft in support of the National Defense Strategy. However, the committee is concerned about the quantity and timing of procurement of fifth generation aircraft and understands that the Marine Corps has placed additional aircraft on its unfunded priority list.

Therefore, the committee recommends an increase of \$249.1 million in line number 5 of APN for the procurement of 2 additional F-35B aircraft.

F-5 aircraft procurement

The budget request included \$39.7 million in line number 22 of Aircraft Procurement, Navy (APN), for 22 F-5 aircraft.

The committee recognizes the importance of the Department of Defense's efforts to increase adversary air training capacity for the Navy and Marine Corps. However, the committee is concerned that the purchase of used third generation aircraft will not address the advanced training requirements laid out in the National Defense Strategy and could be met by the continued use of contracted adversary and close air support.

Therefore, the committee recommends a decrease of \$39.7 million in line number 22 of APN.

F-35B Spares

The budget request included \$2.2 billion in line number 67 of Aircraft Procurement, Navy (APN), for aircraft spares and repair parts.

The committee recognizes the importance of the Navy's and Marine Corps' efforts to modernize and equip themselves with the most advanced and capable aircraft in support of the National Defense Strategy. However, the committee is concerned about the quantity and timing of procurement of fifth generation aircraft and understands that the Chief of Naval Operations has placed additional aircraft on his unfunded priority list.

Therefore, the committee recommends an increase of \$14.9 million in line number 67 of APN for spares.

F-35C Spares

The budget request included \$2.2 billion in line number 67 of Aircraft Procurement, Navy (APN), for spares and repair parts.

The committee recognizes the importance of the Navy's and Marine Corps' efforts to modernize and equip themselves with the most advanced and capable aircraft in support of the National Defense Strategy. However, the committee is concerned about the quantity and timing of procurement of fifth generation aircraft and

understands that the Chief of Naval Operations has placed additional aircraft on his unfunded priority list.

Therefore, the committee recommends an increase of \$24.6 million in line number 67 of APN.

F-35B Engine

The budget request included \$2.2 billion in line number 67 of Aircraft Procurement, Navy (APN), for 10 F-35 aircraft.

The committee recognizes the importance of the Marine Corps' efforts to modernize and equip itself with the most advanced and capable aircraft in support of the National Defense Strategy. However, the committee is concerned about the quantity and timing of procurement of fifth generation aircraft and understands that the Marine Corps has placed an additional engine on its unfunded priority list.

Therefore, the committee recommends an increase of \$28.8 million in line number 67 of APN for the procurement of 1 additional F-35B engine.

Tomahawk

The budget request included no funding in line number 3 of Weapons Procurement, Navy (WPN), for Tomahawk.

The committee notes that the Department of the Navy's original plan was to re-certify the existing inventory of Tomahawk missiles. Despite investment to facilitate the production line's transitioning from production to re-certification, the Navy is now requesting to restart the Tomahawk production line. The committee is concerned that this reversal in acquisition strategy does not have a thorough plan or requirement.

Therefore, the committee recommends a decrease of \$56.3 million in line number 3 of WPN for test equipment and support of concurrent production and re-certification activities and encourages the Department of Navy to provide an updated plan for the Tomahawk missile.

LCS Over-the-Horizon missile

The budget request included no funding in line number 19 of Weapons Procurement, Navy (WPN), for the Littoral Combat Ship (LCS) Over-the-Horizon (OTH) Missile.

The committee notes that the OTH missile acquisition strategy is accelerated and contains unnecessary risk.

Therefore, the committee recommends a decrease of \$20.0 million in line number 19 of WPN for the LCS OTH Missile.

MK-48 torpedo

The budget request included no funding in line number 29 of Weapons Procurement, Navy (WPN), for the MK-48 Torpedo.

The Chief of Naval Operations' unfunded priorities list requested an increase in procurement by 13 torpedoes to maximize the production line.

Therefore, the committee recommends an increase of \$16.0 million for line number 29 of WPN for the MK-48 Torpedo.

Columbia-class submarine advance procurement

The budget request included \$1.7 billion in line number 1 of Shipbuilding and Conversion, Navy (SCN), for *Columbia*-class submarine advance procurement.

The committee believes that expanding the capabilities of the second- and third-tier contractors in the submarine industrial base should lead to greater cost savings and improved efficiency as production increases to meet the *Columbia*-class procurement schedule and higher requirement for *Virginia*-class attack submarines in the Navy's latest Force Structure Assessment.

The committee notes that the budget request includes some funding for submarine industrial base expansion to ensure that second- and third-tier contractors are able to meet increased production requirements. The committee understands that an additional \$125.0 million could be executed to further address such requirements.

Therefore, the committee recommends an increase of \$125.0 million in line number 1 of SCN for *Columbia*-class submarine advance procurement.

The committee directs the Secretary of the Navy to notify the congressional defense committees, in writing, within 30 days of obligating funds provided for submarine industrial base expansion. The notification shall include: obligation date, contractor name or names, location, description of the shortfall to be addressed, actions to be undertaken, desired end state, usable end items to be procured, period of performance, dollar amount, projected associated savings including business case analysis if applicable, contract name, and contract number.

Carrier replacement program

The budget request included \$2.3 billion in line number 2 of Shipbuilding and Conversion, Navy (SCN), for the carrier replacement program.

The committee notes that the John S. McCain National Defense Authorization Act for Fiscal Year 2019 (Public Law 115–232) authorized the aircraft carrier designated CVN–81.

Therefore, the committee recommends a quantity decrease from 1 to 0 in line number 2 of SCN for the carrier replacement program.

Virginia-class submarine program

The budget request included \$7.2 billion in line number 3 of Shipbuilding and Conversion, Navy (SCN), for *Virginia*-class submarines.

The committee notes that the typical procurement funding profile for *Virginia*-class submarines consists of 2 years of advance procurement followed by 1 year of full funding procurement. The committee further notes that the budget request's proposed procurement of a third submarine (SSN–812) includes funds only in fiscal year 2020 and is underfunded by \$667.0 million. Based partially on this funding approach, SSN–812 is scheduled to be delivered after the 2 submarines planned to be procured in fiscal year 2023, requiring, in effect, 3 years of advance procurement and 1 year of full funding.

The committee also understands that the Navy is considering a significant design change for SSN-812, which would require approximately \$1.2 billion in additional funding, potentially bringing the total cost of SSN-812 to \$5.0 billion with an unfunded liability of more than \$1.8 billion as compared to the budget request.

The committee is concerned that the budget request for SSN-812 is significantly underfunded, departs from the traditional funding profile for attack submarines, may include a significant design change not reviewed as part of this budget request, and does not account for the effect of SSN-812's increased demand on critical suppliers already struggling to meet existing Navy procurement plans.

Accordingly, the committee directs the Secretary of the Navy to submit an updated SSN-812 acquisition strategy to the congressional defense committees concurrent with the Navy's fiscal year 2021 budget request. This strategy shall include an updated Component Cost Estimate, design changes that depart from the Block V *Virginia*-class submarine design, and an assessment of the effect SSN-812 will have on critical suppliers.

Additionally, the committee is concerned that the budget request's proposal to remove the Virginia Payload Module (VPM) from SSN-804 would introduce excessive operational and acquisition risk as the Navy seeks to replace the strike capacity of the retiring *Ohio*-class guided missile submarines with VPM on *Virginia*-class submarines.

Therefore, the committee recommends a decrease of \$3.0 billion for SSN-812 and an increase of \$522.1 million for SSN-804 VPM, for a net decrease of \$2.5 billion, in line number 3 of SCN for *Virginia*-class submarines.

Virginia-class submarine advance procurement

The budget request included \$2.8 billion in line number 4 of Shipbuilding and Conversion, Navy (SCN), for *Virginia*-class submarine advance procurement.

The committee notes that attack submarines provide critical capabilities necessary to execute the National Defense Strategy. The committee is concerned that, under current plans, the Navy will not meet its requirement of 66 attack submarines until fiscal year 2048.

Therefore, the committee recommends an increase of \$1.5 billion in line number 4 of SCN for *Virginia*-class submarine advance procurement.

Refueling and complex overhauls of aircraft carriers

The budget request included \$647.9 million in line number 5 of Shipbuilding and Conversion, Navy (SCN), for refueling and complex overhauls (RCOH) of aircraft carriers.

The committee notes unjustified cost growth from the CVN-73 RCOH to the CVN-74 RCOH in basic construction/conversion and ordnance.

Therefore, the committee recommends a decrease of \$50.0 million in line number 5 of SCN for refueling and complex overhauls of aircraft carriers.

Refueling and complex overhaul advance procurement

The budget request included no funding in line number 6 of Shipbuilding and Conversion, Navy (SCN), for refueling and complex overhaul (RCOH) advance procurement.

The committee does not support the budget request's proposal to not refuel the USS *Harry S. Truman* (CVN-75).

Therefore, the committee recommends an increase of \$16.9 million to restore the CVN-75 RCOH in line number 6 of SCN for refueling and complex overhaul advance procurement.

Arleigh Burke-class destroyers

The budget request included \$5.1 billion in line number 8 of Shipbuilding and Conversion, Navy (SCN), for *Arleigh Burke*-class destroyer procurement.

The committee notes that the budget request includes procurement of three *Arleigh Burke*-class destroyers, which is one additional destroyer in fiscal year 2020 as compared to last year's request. The committee has not received sufficient justification for the unit cost increases of the fiscal year 2020 destroyers, as compared to last year's request. In addition, the committee notes that this program has available prior years funds, which are excess to need.

Therefore, the committee recommends a decrease of \$20.0 million in line number 8 of SCN.

Arleigh Burke-class destroyer advance procurement

The budget request included \$224.0 million in line number 9 of Shipbuilding and Conversion, Navy (SCN), for *Arleigh Burke*-class destroyer advance procurement.

The committee notes that the Navy future years defense program includes procurement of two *Arleigh Burke*-class destroyers in fiscal year 2021, which would be procured using a multiyear procurement contract. The committee understands that advance procurement of long lead time material could reduce component costs and enable optimal ship construction intervals.

Therefore, the committee recommends an increase of \$260.0 million in line number 9 of SCN.

LPD-class amphibious transport ship

The budget request included no funding in line number 12 of Shipbuilding and Conversion, Navy (SCN), for procurement of LPD Flight II-class amphibious transport ships.

The committee notes that the Navy has identified LPD-30, which was authorized and appropriated in fiscal year 2018, as the first Flight II LPD. In the fiscal year 2019 budget request, the Navy planned to procure the next Flight II LPD, LPD-31, in fiscal year 2020. The committee is concerned that the fiscal year 2020 budget request's delay of procurement of LPD-31 to fiscal year 2021 could result in production inefficiency, increased cost, and delay in reaching the Navy's requirement for 38 amphibious ships.

Therefore, the committee recommends an increase of \$525.0 million in line number 12 of SCN for incremental funding of the amphibious transport ship designated LPD-31.

The committee's intent is for the Navy to use the \$350.0 million appropriated in SCN line number 13 in fiscal year 2019 and additional fiscal year 2020 funds in SCN line number 12 to procure LPD-31 long-lead material and start construction as efficiently as possible. Consistent with the budget request, the committee expects the Navy to request the balance of costs for LPD-31 in fiscal year 2021.

LPD-class amphibious transport ship advance procurement

The budget request included \$247.1 million in line number 13 of Shipbuilding and Conversion, Navy (SCN), for advance procurement of LPD Flight II-class amphibious transport ships.

The committee recommends transferring the funds requested in line number 13 of SCN to line number 12 of SCN to support incremental funding of the amphibious transport ship designated LPD-31.

Therefore, the committee recommends a decrease of \$247.1 million in line number 13 of SCN for advance procurement of LPD Flight II-class amphibious transport ships.

LHA replacement amphibious assault ship

The budget request included no funding in line number 15 of Shipbuilding and Conversion, Navy (SCN), for procurement of LHA replacement amphibious assault ships.

The committee remains concerned with the Navy procurement profile for large deck amphibious assault ships, which includes a span of 7 years until the next large deck amphibious assault ship (LHA-9) would be procured in fiscal year 2024.

The committee notes that efficiencies could be gained by reducing this span, including steadier workflow with an increased learning curve, material and equipment suppliers with more predictable delivery contracts, and a more effective continuous improvement schedule.

The committee urges the Secretary of the Navy to accelerate procurement of LHA-9, including putting the \$356.0 million appropriated in fiscal year 2019 for this ship on contract to procure long lead-time material as soon as possible and leveraging the incremental funding authority provided elsewhere in this Act to start construction and build LHA-9 as efficiently as possible.

Therefore, the committee recommends an increase of \$650.0 million in line number 15 of SCN.

Outfitting

The budget request included \$754.7 million in line number 23 of Shipbuilding and Conversion, Navy (SCN), for outfitting.

Based on planned delivery dates, the committee notes that post-delivery funding is early-to-need for LCS-21 (\$5.0 million). The committee also notes the unjustified outfitting cost growth for SSN-793, SSN-794, SSN-795, and SSN-796 (\$20.0 million). The committee further notes unjustified post-delivery cost growth for DDG-1000 (\$25.0 million).

Therefore, the committee recommends a decrease of \$50.0 million in line number 23 of SCN.

Service craft

The budget request included \$56.3 million in line number 25 of Shipbuilding and Conversion, Navy (SCN), for service craft.

In order to increase training opportunities for Surface Warfare Officer candidates from all accession sources, the committee believes that the Navy should replace the six YP-676 class craft slated for disposal with upgraded YP-703 class craft that incorporate modernization, training, and habitability improvements derived from lessons learned with existing YP-703 craft.

The committee urges the Secretary of the Navy to release a request for proposals for the detail design and construction of upgraded YP-703 class craft not later than fiscal year 2020. The committee notes that the Navy's current cost estimate for acquisition of the first upgraded YP-703 class craft is \$25.5 million.

Therefore, the committee recommends an increase of \$25.5 million in line number 25 of SCN.

Expeditionary Fast Transport (T-EPF 14) conversion

The budget request included \$55.7 million in line number 28 of Shipbuilding and Conversion, Navy (SCN), for completion of prior year shipbuilding programs.

The committee notes that the Chief of Naval Operations' unfunded priority list states that additional funding could provide for the conversion of an Expeditionary Fast Transport (T-EPF 14) into an Expeditionary Medical Transport to better fulfill distributed maritime medical requirements.

Therefore, the committee recommends an increase of \$49.0 million in line number 28 of SCN.

Ship to shore connector advance procurement

The budget request included no funding in line number 29 of Shipbuilding and Conversion, Navy (SCN), for ship to shore connector advance procurement.

The committee understands that additional funding could provide needed stability for certain suppliers in the ship to shore connector program.

Therefore, the committee recommends an increase of \$40.4 million in line number 29 of SCN.

Hull, mechanical, and electrical upgrades for Arleigh Burke-class destroyers

The budget request included \$31.6 million in line number 2 of Other Procurement, Navy (OPN), for surface combatant hull, mechanical, and electrical equipment.

The committee notes that the Chief of Naval Operations' unfunded priority list states that additional funding could provide for reliability upgrades to the Integrated Bridge and Navigation and associated systems, including the addition of physical throttles to the ship control console, a voyage data recorder, and software upgrades to the steering and propulsion control system.

Therefore, the committee recommends an increase of \$19.0 million in line number 2 of OPN.

Expeditionary mine countermeasures

The budget request included \$71.2 million in line number 20 of Other Procurement, Navy (OPN), for underwater explosive ordnance disposal programs.

The committee notes that the Mark 18 unmanned underwater vehicle (UUV) program is proven and remains the only mine countermeasures (MCM) UUV program with Milestone C approval and in full rate production.

Additionally, the committee understands that the Navy has a validated need for eight additional expeditionary MCM (ExMCM) companies beyond the eight already outfitted. The committee further understands that \$11.0 million in additional funding could outfit 4 additional ExMCM companies with the full complement of Mark 18 UUVs.

Therefore, the committee recommends an increase of \$11.0 million in line number 20 of OPN.

Littoral Combat Ship mine countermeasures mission modules

The budget request included \$197.1 million in line number 30 of Other Procurement, Navy (OPN), for the procurement of Littoral Combat Ship mine countermeasures mission module equipment.

The committee notes that the Navy is requesting funding to purchase equipment that has not yet undergone operational testing, which is an approach that, as the Government Accountability Office has shown, leads to cost growth and schedule delays. The committee believes that the following requested systems would constitute excessive procurement ahead of satisfactory testing: 6 unmanned surface vehicle and minesweeping payload delivery systems, 4 minehunting payload delivery systems (new), 3 minehunting payload delivery systems (backfit), and 2 buried minehunting modules, including support equipment.

Therefore, the committee recommends a decrease of \$129.8 million in line number 30 of OPN.

Knifefish

The budget request included \$40.5 million in line number 34 of Other Procurement, Navy (OPN), for the procurement of small and medium unmanned underwater vehicles.

The committee notes that the two Knifefish systems which are to be procured with this funding require further testing, including the initial operational test and evaluation period that is currently scheduled for fiscal year 2021.

Therefore, the committee recommends a decrease of \$29.9 million in line number 34 of OPN.

Surface Electronic Warfare Improvement Program

The budget request included \$420.2 million in line number 44 of Other Procurement, Navy (OPN), for the procurement of electronic warfare equipment.

The committee notes that procurement of at least two of the three Surface Electronic Warfare Improvement Program Block 3 units is early-to-need based on the Navy's installation plan.

Therefore, the committee recommends a decrease of \$62.0 million in line number 44 of OPN.

Ship's signal exploitation equipment expansion

The budget request included \$194.8 million in line number 45 of Other Procurement, Navy (OPN), for shipboard information warfare exploitation.

The committee notes that the Chief of Naval Operations' unfunded priority list states that additional funding could provide for expansion of ship's signal exploitation space and installation of ship's signal exploitation equipment modifications on Flight I *Arleigh Burke*-class destroyers.

Therefore, the committee recommends an increase of \$8.0 million in line number 45 of OPN.

Next Generation Surface Search Radar

The budget request included \$168.4 million in line number 70 of Other Procurement, Navy (OPN), for the procurement of items less than \$5 million.

The committee notes that procurement of 28 Next Generation Surface Search Radars is early-to-need based on the Navy's installation plan.

Therefore, the committee recommends a decrease of \$23.8 million in line number 70 of OPN.

Sonobuoys

The budget request included \$260.6 million in line number 85 of Other Procurement, Navy (OPN), for the procurement of sonobuoys.

The committee notes that greater-than-expected sonobuoy expenditures in fiscal year 2019 resulted in the Chief of Naval Operations' requesting procurement of additional sonobuoys as a fiscal year 2020 unfunded priority.

Therefore, the committee recommends an increase of \$50.0 million in line number 85 of OPN.

Electronic Procurement System

The budget request included \$66.1 million in line number 122 of Other Procurement, Navy (OPN), for Command Support Equipment, including \$6.3 million for Electronic Procurement System.

The committee remains concerned about unnecessarily bespoke contract writing systems and processes.

Accordingly, the committee recommends a decrease of \$6.3 million in line number 122 of OPN.

Air Force

F-35A

The budget request included \$4.3 billion in line number 1 of Aircraft Procurement, Air Force (APAF), for 48 F-35 aircraft.

The committee recognizes the importance of the Air Force's efforts to modernize and equip itself with the most advanced and capable aircraft in support of the National Defense Strategy. However, the committee is concerned about the quantity and timing of

procurement of fifth generation aircraft and understands that the Chief of Staff of the Air Force has placed additional aircraft on his unfunded priority list.

Therefore, the committee recommends an increase of \$1.1 billion in line number 1 of APA for the procurement of 12 additional F-35 aircraft.

F-35 advanced procurement

The budget request included \$655.5 million in line number 2 of Aircraft Procurement, Air Force (APAF), for advanced procurement of F-35 aircraft.

The committee recognizes the importance of the Air Force's efforts to modernize and equip itself with the most advanced and capable aircraft in support of the National Defense Strategy. However, the committee is concerned about the quantity and timing of procurement of fifth generation aircraft and understands that the Chief of Staff of the Air Force has placed additional aircraft on his unfunded priority list.

Therefore, the committee recommends an increase of \$156.0 million in line number 2 of APAF for advanced procurement to support 12 additional F-35A aircraft.

F-15X

The budget request included \$1.1 billion in line number 3 of Aircraft Procurement, Air Force (APAF), for 8 F-15X aircraft.

The committee recognizes the importance of the Air Force's efforts to modernize its aging air superiority fighters. The committee also understands that the use of existing non-developmental aircraft already in inventory allows for the continued readiness of current F-15 squadrons. However, the committee is concerned that the associated non-recurring engineering costs, as programmed, are above what should be for a non-developmental aircraft.

Therefore, the committee recommends a decrease of \$162.0 million in line number 3 of APAF.

KC-46

The budget request included \$2.2 billion in line number 5 of Aircraft Procurement, Air Force (APAF), for 12 KC-46 aircraft.

The committee recognizes the importance of the Air Force's efforts to modernize and equip itself with the most advanced and capable aircraft in support of the National Defense Strategy. However, the committee is concerned about the quantity and timing of procurement of tanker aircraft and understands that the Chief of Staff of the Air Force has placed additional aircraft on his unfunded priority list.

Therefore, the committee recommends an increase of \$471.0 million in line 5 of APAF for the procurement of 3 additional KC-46 aircraft.

F-15 ADCP

The budget request included \$481.1 million in line number 25 of Aircraft Procurement, Air Force (APAF), for the procurement of new avionics radars.

The committee recognizes the importance of the Air Force efforts to modernize the legacy 4th generation fleet in support of the National Defense Strategy. The committee also understands the Air Force's intention to recapitalize the F-15 fleet with new F-15X aircraft.

Therefore, the committee recommends a decrease of \$75.1 million in line 25 of APAF as a reduction of the procurement of F-15 avionics.

F-15 IFF modernization

The budget request included \$481.1 million in line number 25 of Aircraft Procurement, Air Force (APAF), for procurement of new IFF.

The committee recognizes the importance of the Air Force efforts to modernize the legacy fourth generation fleet in support of the National Defense Strategy. The committee also understands the Air Force's intention to recapitalize the F-15 fleet with new F-15X aircraft.

Therefore, the committee recommends a decrease of \$29.6 million in line 25 of APAF as a reduction of the procurement of F-15 IFF.

F-15 Longerons

The budget request included \$481.1 million in line number 25 of Aircraft Procurement, Air Force (APAF), for the procurement of 64 F-15 Longerons.

The committee recognizes the importance of the Air Force efforts to modernize the legacy fourth generation fleet in support of the National Defense Strategy. The committee also understands the Air Force's intention to recapitalize the F-15 fleet with new F-15X aircraft.

Therefore, the committee recommends a decrease of \$24.6 million in line number 25 of APAF as a reduction of the procurement of F-15 Longerons.

F-15 Radar

The budget request included \$481.1 million in line 25 of Aircraft Procurement, Air Force (APAF), for procurement of new radars.

The committee recognizes the importance of the Air Force efforts to modernize the legacy 4th generation fleet in support of the National Defense Strategy. The committee also understands the Air Force's intention to recapitalize the F-15 fleet with new F-15X aircraft.

Therefore, the committee recommends a decrease of \$23.7 million in line number 25 of APAF as a reduction of the procurement of F-15 radars.

F-16 modernization

The budget request included \$234.8 million in line number 26 of Aircraft Procurement, Air Force (APAF).

The committee recognizes the importance of the Air Force's efforts to modernize its fourth generation fighter fleet and equip itself with the most advanced and capable radars in support of the National Defense Strategy. However, the committee is concerned

about the quantity and timing of procurement of advanced radars for the entire F-16 fleet.

Therefore, the committee recommends an increase of \$75.0 million in line number 26 of APA for the procurement of 30 additional radars.

F-15C EPAWSS

The budget request included \$149.0 million in line number 31 of Aircraft Procurement, Air Force (APAF), for F-15 Eagle Passive Active Warning Survivability System (EPAWSS).

The committee recognizes the importance of the Air Force's efforts to modernize and equip itself with the most advanced electronic warfare capability available in support of the National Defense Strategy. However, the committee also understands the Air Force's intention to recapitalize the F-15 fleet with new F-15X aircraft already equipped with the EPAWSS.

Therefore, the committee recommends a decrease of \$67.2 million in line number 31 of APAF as a reduction of the procurement of additional F-15 EPAWSS kits.

Command and control sustainability

The budget request included \$28.8 million in line number 58 of Aircraft Procurement, Air Force (APAF), for E-8.

The committee notes that command and control nodes are at a significant disadvantage due to aging communications.

Therefore, the committee recommends an increase of \$30.0 million in line 58 of APAF for next-generation satellite communication radios that are both SATURN and Mobile User Objective System capable as well as Multifunctional Information Distribution System-Joint Tactical Radio System terminals.

F-35A Spares

The budget request included \$708.0 million in line number 69 of Aircraft Procurement, Air Force (APAF), for spares and repair parts.

The committee recognizes the importance of the Air Force's efforts to modernize and equip itself with the most advanced and capable aircraft in support of the National Defense Strategy. However, the committee is concerned about the quantity and timing of procurement of fifth generation aircraft and understands that the Chief of Staff of the Air Force has placed additional aircraft on his unfunded priority list.

Therefore, the committee recommends an increase of \$96.0 million in line number 69.

KC-46 Spares

The budget request included \$708.0 million in line number 69 of Aircraft Procurement, Air Force (APAF), for spares and repair parts.

The committee recognizes the importance of the Air Force's efforts to modernize and equip itself with the most advanced and capable aircraft in support of the National Defense Strategy. However, the committee is concerned about the quantity and timing of procurement of tanker aircraft and understands that the Chief of

Staff of the Air Force has placed additional aircraft on his unfunded priority list.

Therefore, the committee recommends an increase of \$141.0 million in line number 69 of APAF for spares.

RQ-4 spare parts

The budget request included \$708.0 million in line number 69 of Aircraft Procurement, Air Force (APAF), for spares and repair parts.

The committee is concerned about the quantity and timing of spare parts for the RQ-4.

Therefore, the committee recommends an increase of \$25.0 million in line number 69 of APAF.

Minuteman III Modifications

The budget request included \$50.8 million in line number 14 of Missile Procurement, Air Force (MPAF), for Minuteman III modifications.

The committee supports the request of the Air Force to re-align certain funds from other projects to support implementation of the Intercontinental Ballistic Missile Crypto Upgrade II program.

Accordingly, the committee recommends an increase of \$8.9 million in line number 14 of MPAF for Minuteman III Modifications.

Air-Launched Cruise Missile

The budget request included \$77.4 million in line number 17 in Missile Procurement, Air Force (MPAF), for the Air-Launched Cruise Missile.

The committee supports the request of the Air Force to re-align certain funds from the Support Equipment sub-project to support other Air Force nuclear priorities.

Accordingly, the committee recommends a decrease of \$8.9 million in line number 17 of MPAF for the Air-Launched Cruise Missile.

F-35 training and range modernization

The budget request included \$234.0 million in line number 32 of Other Procurement, Air Force (OPAF), for Combat Training Ranges.

The committee recognizes the importance of modernizing USAF training ranges for 5th generation aircraft. The committee notes that 35 percent of the current F-35A training curriculum requires pilot training scenarios involving use of joint threat emitters (JTEs) in order to simulate combat-like training conditions.

Therefore, the committee recommends an increase of \$28.0 million in Other Procurement, Air Force, for line number 32 to install four JTEs for F-35A training.

Air Force Integrated Personnel and Pay System

The budget request included \$20.9 million in line number 36 of Other Procurement, Air Force (OPAF), for Integrated Personnel and Pay System.

The committee is concerned about poor agile implementation and infrequent capability delivery.

Accordingly, the committee recommends a decrease of \$20.9 million in line number 36 of OPAF.

Defense Wide

Sharkseer transfer

The budget request included \$3.3 million in line number 8 of Procurement, Defense-wide, Information Systems Security.

The committee included a provision in the John S. McCain National Defense Authorization Act for Fiscal Year 2019 (Public Law 115–232) that required the Secretary of Defense to transfer the operations and maintenance for the Sharkseer cybersecurity program from the National Security Agency to the Defense Information Systems Agency.

Therefore, the committee recommends an increase of \$1.4 million in line number 8 for Procurement, Defense-wide, for the Sharkseer program.

Terminal High Altitude Area Defense Missile Defense Agency procurement

The budget request included \$425.9 million in line number 28 of Procurement, Defense-wide, for Terminal High Altitude Area Defense (THAAD) procurement by the Missile Defense Agency (MDA).

Elsewhere in this report, the committee has stated its views regarding the transition of the THAAD program from the MDA to the Department of the Army.

Therefore, the committee recommends a decrease of \$425.9 million in line number 28 of Procurement, Defense-wide.

Sharkseer transfer

The budget request included \$1.5 million in line number 44 of Procurement, Defense-wide, Information Systems Security Program (ISSP).

The committee included a provision in the John S. McCain National Defense Authorization Act for Fiscal Year 2019 (Public Law 115–232) that required the Secretary of Defense to transfer the operations and maintenance for the Sharkseer cybersecurity program from the National Security Agency to the Defense Information Systems Agency.

Therefore, the committee recommends a decrease of \$1.4 million in line number 44 of Procurement, Defense-wide, for the Sharkseer program.

Radio Frequency Countermeasure System

The budget request included \$173.4 million in line number 61 of Procurement, Defense-wide (PDW), AC/MC–130J, of which \$41.6 million is for the AC/MC–130J Radio Frequency Countermeasure System (RFCM).

The committee understands that the RFCM program is experiencing schedule delays due to integration and compatibility issues with the technology.

Therefore, the committee recommends a decrease of \$8.8 million to line number 61 of PDW, AC/MC–130J, for a total of \$32.8 million for RFCM. The committee notes that, elsewhere in the Act,

there is a symmetric increase to U.S. Special Operations Command's future vertical lift research and development efforts, a high priority unfunded requirement identified by the command.

Transfer OCO to Base

The budget request included \$118.9 billion for Procurement in base funding. The committee notes that the President's budget request included \$97.9 billion in the Overseas Contingency Operations (OCO) account for activities that are traditionally funded out of base accounts. The committee believes that OCO for Base funding should be transferred into the base accounts.

Accordingly, the committee recommends an increase of \$13.5 billion to Procurement.

Items of Special Interest

A-10 modernization

The committee is encouraged that the Air Force is executing a modernization strategy to provide unmatched air power and believes that modernizing the A-10 fleet is integral to this strategy. The committee also believes that upgrades to weapons delivery, management systems, and the electronic warfare and communications suite that keep pace with threat advancements and proliferation are critical to the continued success of the weapons system. The committee notes that these enhancements and the aircraft wing replacements will maintain the effectiveness of the A-10C through the 2030s.

Therefore, the committee recommends that continuous funding for the modernization of the A-10C be provided from fiscal year 2020 through fiscal year 2030 in order to achieve upgrades that are long overdue.

Acquisition strategy for LHA-9 and LHA-10

The committee notes that the Navy estimates that \$4.0 billion will be saved using a block buy acquisition strategy for the procurement of CVN-80 and CVN-81.

The committee believes that such an approach for LHA-9 and LHA-10 could provide substantial cost savings as well as needed stability and predictability for the shipbuilder and its vendor base. Accordingly, not later than October 1, 2019, the committee directs the Secretary of the Navy to submit a report to the congressional defense committees on the merits of pursuing a block buy acquisition strategy for LHA-9 and LHA-10.

This report shall include a business case analysis comparing the cost and schedule of single ship contracts for LHA-9 and LHA-10 with a block buy contract for such ships as well as a description of other key considerations that the Secretary deems appropriate. If the business case analysis shows that pursuing a block buy strategy for LHA-9 and LHA-10 has merit, the committee strongly encourages the Secretary to consider inclusion of such a proposal in the Navy's budget request for fiscal year 2021.

Acquisition strategy for LPD Flight II-class ships

The committee notes that the Navy estimates that \$4.0 billion will be saved using a block buy acquisition strategy for the procurement of CVN-80 and CVN-81.

The committee believes that a block buy or multiyear procurement approach for LPD Flight II-class amphibious transport ships could provide substantial cost savings as well as needed stability and predictability for the shipbuilder and its vendor base.

Accordingly, not later than October 1, 2019, the committee directs the Secretary of the Navy to submit a report to the congressional defense committees on the merits of pursuing a block buy or multiyear procurement acquisition strategy for LPD Flight II-class ships.

This report shall include a business case analysis comparing the cost and schedule of single ship contracts with a block buy or multiyear contract for such ships as well as a description of other key considerations that the Secretary deems appropriate.

If the business case analysis shows that pursuing a block buy or multiyear procurement strategy for LPD Flight II-class ships has merit, the committee strongly encourages the Secretary to consider inclusion of such a proposal in the Navy's budget request for fiscal year 2021.

Active Protection System for Stryker

Active Protection Systems (APS) can be a critical capability to protect our warfighters on the battlefield. The committee notes that the Army is currently procuring four brigade sets of Trophy for the M1 Abrams tank and that a decision was recently made to procure a brigade set of the Iron Fist system for the M2 Bradley.

The Army has evaluated various systems for integration on to Stryker vehicles but has not made a final decision on what system is most effective and suitable for the platform. According to a congressionally directed report that was submitted in October 2018, the Army had anticipated making a vendor selection during the second quarter of fiscal year 2019. However in testimony before the Senate Armed Services Committee Subcommittee on Airland in April 2019, senior Army leadership testified that it may take significantly more time for the Army to make a determination on whether to proceed with either of the systems being evaluated.

Therefore, the committee directs the Secretary of the Army to provide a briefing to the committee by October 1, 2019, that provides an update on the Army's efforts to assess APS vendors for integration onto the Stryker platform, including the effectiveness of systems tested, plans for future testing, proposals for future development, and a timeline for fielding.

Adaptive Threat Force

The committee notes that the Marine Corps Warfighting Laboratory's Adaptive Threat Force efforts in concept-based experimentation seek to replicate future operating environments and future adversaries. The committee believes that predictive understanding of potential asymmetric advantages of adversaries can be identified during experimentation through the use of red teams and live ad-

versary forces. Further, the committee notes that these efforts can also lead to improved training of warfighters.

Advanced Helicopter Training System

The committee believes that the Department of the Navy must rapidly develop realistic rotary training platforms to help ensure that the next generation of naval aviators remains proficient in conducting sustained air operations at sea. The Advanced Helicopter Training System (AHTS) addresses the capacity and capability gaps for the Chief of Naval Air Training rotary wing training pipeline. Through the AHTS program, the Navy will revamp its training syllabus by acquiring 130 helicopters and advanced simulators to produce more than 600 student naval aviators and execute 90,000 flight hours annually. The committee concurs with the Navy's insistence that the TH-XX be Federal Aviation Administration-Instrument Flight Rules (FAA-IFR) certified prior to awarding a contract, thereby assuring that the Navy student pilot training benefits from safety features and standards inherent in a fully developed and FAA-IFR certified aircraft.

Advanced survivability modeling capability for air-launched weapons

The emergence of great power competition is the central long-term planning challenge for the Department of Defense (DOD). More capable adversaries employing highly advanced integrated air defense systems can create heavily contested environments that deny U.S. forces the freedom to operate. Such integrated air defense systems present a threat not only to launch systems but also to their air-launched conventional weapons. Launch platforms and their suite of strike weapons must possess sufficient range, autonomy, survivability, and lethality for mission effectiveness in order to remain relevant in future scenarios.

The committee is concerned that current air-launched conventional weapons do not adequately account for advanced terminal defense systems that often protect high-value mobile targets both on land and at sea. Advanced integrated air defenses are expected to be effective against weapons that were designed to be survivable by virtue of a single attribute (e.g., speed) rather than a combination of attributes that enable successful engagement of high-value targets with state-of-the-art, close-in weapon systems.

In addition, the committee is concerned about the fidelity of DOD models that simulate the effectiveness of adversary close-in defensive systems on conventional strike weapons. The committee strongly encourages the Departments of the Navy and Air Force to emphasize munitions survivability attributes that together improve probability of mission success.

Therefore, the committee directs both the Secretary of the Air Force and the Secretary of the Navy to provide a briefing, not later than March 1, 2020, that outlines the mission effectiveness of current and planned air-launched conventional weapons for use against high-value mobile targets protected by advanced integrated air defense systems. The briefing must address the following:

- (1) Stand-off requirements;
- (2) Survivability characteristics;

- (3) Weapon lethality;
- (4) A cost-per-kill assessment to evaluate mission effectiveness; and
- (5) A comparison of existing autonomous capability.

Aerospace ground equipment for B-52 Stratofortress

The committee understands that the Air Force bomber vector plans to keep the B-52 weapon system available for conventional and nuclear missions well into the 2040s. Efforts are now underway to update the plane's radars, engines, communications, and navigation equipment. Relatively little effort has been given to the aerospace ground equipment that provide power, inert gas, munitions loading, and other support functions in preparation for a mission, yet this ground support equipment is just as important to mission success as components on the B-52. The committee is concerned that the failure of ground electrical carts can cause a delay of several hours to a bomber mission.

Therefore, the committee directs the Air Force to brief the congressional defense committees, no later than April 30, 2020, on the age of the aerospace ground support equipment currently supporting the B-52 weapon system, their average reliability, and plans to replace or update this equipment in line with keeping the B-52 weapon system operational through 2040.

Air Force Active Association

The committee supports the Air Force's Total Force Integration (TFI) concept to leverage the capabilities of both the Air Force Active Duty and its reserve components. The committee believes that Active Associations are an important component of TFI, providing the opportunity for Active-Duty pilots and personnel to access reserve component aircraft and train with reserve component pilots and maintenance personnel.

The committee remains concerned about the delayed deliveries of the KC-46A aerial refueling tanker and the impact it will have on the existing tanker fleet, most notably extending the service of KC-135 tankers. The committee is further concerned about the continued operation of legacy air refueling platforms and the impact on the Air Force's Active Associations. Therefore, the committee directs the Air Force and Air Mobility Command to notify the congressional defense committees regarding any plans to draw down Active Associations because KC-46A deliveries have been later than planned and, if there are such reductions, to provide a report on plans to restore these existing Active Associations to full strength.

Air Force Future ISR Integration Strategy

The committee is aware of the recent publication of the United States Air Force Next Generation Intelligence, Surveillance, and Reconnaissance (ISR) Dominance Flight Plan and the Air Force's desire to modernize its ISR enterprise. The committee is encouraged by the Air Force's intent to field a resilient, integrated ISR network of manned and unmanned systems to prevail in contested environments, and it believes that this goal aligns with the National Defense Strategy.

The committee notes that the Air Force's future ISR enterprise will comprise both manned and unmanned systems that are integrated with space and cyber assets. While the fielding of advanced autonomous systems and ISR networks will allow for added resiliency, large manned platforms such as the RC-135 are forecasted to remain an integral part of the Air Force ISR system for decades to come, and they offer a unique set of capabilities that are central to meeting the needs of combatant commanders. The committee believes that the Air Force must have the capability to integrate information from both manned and unmanned assets in its future ISR enterprise in order to capitalize on the strengths offered by both platforms. In its effort to realize the goals of its Next Generation ISR Dominance Flight Plan, the Air Force must ensure that all assets and platforms are integrated into a unified concept of operations.

Therefore, the committee directs the Secretary of the Air Force to provide a report to the congressional defense committees, no later than March 1, 2020, detailing the Air Force's plan for integrating both manned and unmanned systems into its future force mix and ISR enterprise. The report shall detail how the Air Force plans to use manned ISR assets alongside unmanned platforms as well as space-based ISR platforms and a networked sensor architecture in support of the warfighter. The report shall also detail planned modernization and survivability upgrades to the manned assets and networks. The report shall:

- (1) Detail the strengths and vulnerabilities in both manned and unmanned ISR elements;
- (2) Provide a detailed description of the data links for both control and data processing;
- (3) Describe the next generation of data link to succeed Link 16 capability; and
- (4) Provide funding data to support this concept across the future years defense program.

Air Force ISR SIGINT data integration

The committee notes the efforts of the Air Force to develop an integrated, capability-focused SIGINT architecture and investment strategy. The committee observes that the investment has already produced significant advances in Air Force SIGINT capability, particularly within the medium-altitude RC-135 Rivet Joint program. The committee is also aware that some significant capability gaps exist against current threats and that the Air Force has not yet addressed diminishing industrial base issues with the high-altitude Airborne Signals Intelligence Payload program. Additionally, the Air Force has not yet achieved a unified enterprise for SIGINT processing, exploitation, and dissemination, despite having a distributed technical architecture within both the RC-135 Rivet Joint and Air Force distributed common ground system programs.

Therefore, the committee directs the Secretary of the Air Force to provide a briefing to the congressional defense committees, no later than March 1, 2020, on how the Air Force is implementing its Next Generation Intelligence, Surveillance, and Reconnaissance Dominance Flight Plan in order to make Air Force airborne SIGINT data from the RC-135, U-2, RQ-4, MQ-9, and future

SIGINT capabilities discoverable and available to the joint warfighter. The briefing shall address, among other things, cloud-based technologies and distributed crew concepts.

Army rotary wing munitions capabilities, capability gaps, and solutions

The committee is concerned that the standoff range advantages of U.S. rotary wing aircraft munitions have eroded when compared to near peer and regional adversaries like Russia, China, Iran, and North Korea. Munitions with greater standoff range and the ability to operate in a GPS-denied or -degraded environment are critical to restoring the Army's dominance in air-to-surface fires.

Therefore, the committee directs the Secretary of the Army to provide a briefing by October 1, 2019, on Army rotary wing munitions capabilities, capability gaps, and potential off-the-shelf solutions. The briefing should include:

- (1) Current U.S. rotary wing munitions capabilities and capability gaps against munitions fielded by Russia, China, Iran, and North Korea;
- (2) Potential off-the-shelf solutions that would bridge these capability gaps, including any munitions that the U.S. tests in calendar year 2019; and
- (3) Detailed information on any testing of non-program of record munitions by the U.S. Army in calendar year 2019, including:
 - (a) An assessment of the effectiveness of the tested munitions to meet threats from near peer adversaries and any operational needs statements from combat aviation brigades for Europe and the Indo-Pacific;
 - (b) An assessment of whether the tested munitions would complement capabilities for current programs of record;
 - (c) A comparison of the tested systems' capabilities against current munitions; and
- (4) The cost and timeline for the Army to field the necessary capability to close this gap, including:
 - (a) Interim fielding to meet current requirements; and
 - (b) Potential enduring solutions.

ATACMS Requirement

The committee is concerned that the current Army Tactical Missile System (ATACMS) inventory is insufficient to meet requirements, especially in light of the National Defense Strategy. The Army total munition requirement for ATACMSs is 4,417 missiles but the current quantity is 1,725 missiles. Despite the shortfall, the Army's plan is to extend the life of existing ATACMSs rather than growing additional capacity. However, the Army has had a difficult time retrieving existing ATACMSs to put them into the shelf-life extension program and thus has relied on new missile production to replace existing inventory. The committee notes that, in the budget request for fiscal year 2020, \$340.6 million of the \$425.9 million for the ATACMS program is for new missile procurement. The committee also notes that the Army's unfunded priorities list requested funding for Cross-Domain ATACMSs to support a United

States Indo-Pacific Combatant Command requirement. Further, the committee notes that the Precision Strike Missile, which would replace ATACMS, will not include cross-domain capabilities until fiscal year 2024 at the earliest. Therefore, the committee recommends that the Army reevaluate decisions to not grow the ATACMS inventory given: (1) The substantial shortfall in inventory as compared to the actual requirement; (2) That the Army is already procuring new all-up rounds; and (3) The new capabilities that the Cross-Domain ATACMS now adds to the program.

Bomber roadmap

The committee is concerned with the timing of multiple programs involving the Air Force bomber force. The committee notes that the strategic threat from peer competitors like China and Russia will only continue to increase, as highlighted in the National Defense Strategy, which will increase demand on the critical bomber force.

Therefore, the committee directs the Secretary of the Air Force to provide a briefing, no later than February 1, 2020, to the congressional defense committees that delineates the strategy and the pathway for legacy bombers as well as the acquisition of the B-21 and its integration in the bomber force. The briefing shall include an updated Air Force bomber roadmap and the Air Force's plans for timing and synchronization of:

- (1) B-52 re-engining and modernization;
- (2) Construction of weapons generation facilities;
- (3) Basing of B-21 conventional and nuclear aircraft; and
- (4) Life cycle sustainment of B-1, B-2, and B-52 aircraft.

Bradley program

The budget request included \$638.8 million in line 5 of Weapons & Tracked Combat Vehicles (WTCV), for the procurement of upgrades to the family of Bradley Fighting Vehicles. As an integral part of the Army's Armored Brigade Combat Team (ABCT), the Bradley is being modernized in a program approved by the Army Acquisition Executive in July 2011 to enhance survivability, mobility, and lethality by procurement of hardware for modifications.

These modifications include two Engineering Change Proposals in this plan, with the Bradley A4 upgrade being the most significant.

As the Army works to align itself with the National Defense Strategy and its focus on near-peer competition, the committee understands that the Army plans to gradually phase out the Bradley and replace it with a new Optionally Manned Fighting Vehicle (OMFV). To achieve this strategy, the Army has formulated a plan to end M2A4 production in fiscal year 2022, following the procurement of 859 vehicles (fielding 5 ABCTs plus 1 prepositioned set), which will enable sufficient funding for the procurement of the OMFV.

The committee supports the Army's planning and budgeting to achieve force modernization with the OMFV and understands that it will take at least 6 years to develop and begin fielding the OMFV. The committee also notes that the Bradley A4 upgrade program is essential to ensuring that the ABCT remains relevant for the next 3 decades. Nonetheless, the committee encourages the Army to ensure that the Bradley industrial base is properly main-

tained until the Army has a high level of confidence that the OMFV program will not be delayed.

Therefore, the committee supports the procurement of upgrades for the family of Bradley Fighting Vehicle modernization across five ABCTs, efforts to sustain the entire fleet, and the incorporation of an Active Protection System into the fleet.

Building Partner Combat Air Capacity

The committee understands the importance of building partner capacity as part of the U.S. National Security Strategy. The committee supports ongoing Department of Defense (DOD) efforts to increase the combat air capability and interoperability of U.S. coalition partners. Proficiency in air combat requires training in a realistic air-combat environment with the ability to provide post-mission reconstruction of maneuvers and tactics, participant pairings, and integration of range targets and simulated threats. That is achieved today around the world using air combat maneuvering instrumentation (AGMI) systems.

Therefore, the committee directs the Secretary of Defense to brief the congressional defense committees, no later than 180 days after the date of the enactment of this Act on DOD's ability to increase the utilization of U.S. approved and interoperable AGMI systems worldwide. The briefing shall, at a minimum, identify current approved world-wide AGMI locations and identify and prioritize locations where new AGMI systems could increase combat air capability of U.S. and partner forces.

Capability to counter supersonic and hypersonic cruise missiles

The committee believes that the Department of Defense is late to need on dealing with the current threat of fielded or soon-to-be fielded supersonic and hypersonic missiles in both the Indo-Pacific and European areas of responsibility.

In addition, the committee believes there is a disconnect between Joint Force doctrine, the responsibility of the area air defense commander, which is normally the Air Component Commander, and the responsibility for air and missile defense, which resides with the U.S. Army, as established in law. This issue is most pronounced with theater air and missile defense, and it has the potential to yield a gap between joint force requirements and available capabilities that will only be increased with constrained spending.

Therefore, the committee directs the Secretary of Defense, in consultation with the Joint Force Air Component Commanders for U.S. Indo-Pacific Command and U.S. European Command, to provide a briefing, not later than January 1, 2020, to the congressional defense committees, on countering supersonic cruise missiles and hypersonic missiles. The briefing must include:

- (1) Currently fielded or soon-to-be fielded adversary supersonic or hypersonic missiles;
- (2) An evaluation of the ability to counter supersonic threats against airfields and Army preposition sites by 2023, based on available forces or potential programs available to be fielded in that timeframe;

(3) An evaluation of the ability to counter hypersonic threats against airfields and Army preposition sites by 2023, based on available forces or potential programs available to be fielded in that timeframe;

(4) Any other subjects or recommendations that the Secretary or Component Commanders wish to include.

Carbon fiber wheels and graphitic foam for Next Generation Combat Vehicle

The committee recognizes the recent effort related to Metal Matrix Composite (MMC) technologies and is encouraged by the U.S. Army Ground Vehicle Systems Center's (GVSC) decision to transition into lower-cost, wider application carbon fiber composite wheels and graphitic carbon foam research to support the Next Generation Combat Vehicle (NGCV). Carbon fiber wheels may reduce vehicle weight, reduce fuel consumption, increase payload capacity, and extend service life for the NGCV. Graphitic Carbon Foam may also reduce vehicle heat signatures and improve heat dissipation from engine and electronics compartments and protect against blast energy, directed energy weapons, and electromagnetic pulse threats. Finally, these products lend themselves to be produced at remote locations with additive manufacturing processes in support of NGCV operation and maintenance.

The Defense Logistics Agency has designated both graphite and carbon fiber as strategic materials. The committee notes that the GVSC has identified low-cost mesophase pitch as a United States-based source of graphite that can be used to produce carbon fiber, graphitic carbon foam, and battery technologies for the NGCV. The committee acknowledges the versatility and broad application that carbon fiber technology provides for the armed services by reducing the weight of parts by over 50% as compared to traditional steel components.

The committee recommends that the GVSC continue to develop, test, and field low-cost mesophase pitch carbon fiber and graphitic carbon foam components that can reduce vehicle weight, reduce fuel consumption, increase payload capacity, extend service life, improve survivability, and utilize additive manufacturing technology for the NGCV program.

CH-47F Block II Program

The budget request contained \$174.4 million in PE 67137A within Research, Development, Test, and Evaluation (RDT&E), Army for the CH-47 Block II program. The CH-47F Block II program is designed to upgrade the current CH-47F Block I heavy-lift rotorcraft in order to improve readiness and commonality, extend the useful life of the Block I helicopter, and restore additional payload capacity for the airframe. The committee understands that the budget request fully funds the completion of the Engineering and Manufacturing Development (EMD) phase of the Block II program. The committee also understands that, subject to successful completion of the EMD phase, the Army plans to conduct a Milestone C low-rate production decision beginning in fiscal year 2021. However, the committee notes that the current Future Years Defense

Program (FYDP) provides no additional procurement funding for the CH-47 Block II program.

Further, the committee notes that the formal Analysis of Alternatives for the CH-47 Block II indicated that, in order to maintain fleet readiness, the Army must begin to remanufacture CH-47 Block I rotorcraft between fiscal years 2024 and 2028 and sustain full-rate production of 12 aircraft per year by fiscal year 2030. The committee is concerned about the impact from the lack of programmed funding in the FYDP for CH-47 Block II production on the heavy-lift rotorcraft industrial base and the Army's long-term plans to maintain fleet readiness post-FYDP.

Therefore, the committee directs the Secretary of the Army to provide a briefing by October 1, 2019, on the following topics: potential readiness impacts to the current CH-47F fleet should Block II production be delayed post-FYDP; a cost-benefit analysis comparing the CH-47 Block II upgrade program to CH-47F remanufacture efforts; the impacts to current MH-47G aircraft production given the delay of Block II production; the analysis the Army used to assess the strategic risk to the industrial base, including the supplier base; and the Army's current strategy for modernizing the heavy-lift rotorcraft fleet.

CH-53K King Stallion program

The committee notes that the U.S. Marine Corps validated a requirement for heavy-lift expeditionary rotary wing aviation to support ship-to-shore, shore-to-shore, and shore-to-ship movement of personnel and equipment. With the existing heavy lift platform, the

CH-53E, nearing the end of its service life, the Marine Corps has embarked on a procurement effort for the CH-53K King Stallion to maintain or improve the current capability. The committee notes, however, that this program is at least 19 months behind schedule and has experienced cost growth of over 20 percent above the 2005 baseline. At a cost now estimated to exceed \$85 million per aircraft, the committee is concerned that the cost of this program is pulling resources away from other urgently needed modernization efforts.

Therefore, the committee urges the Department of the Navy and the U.S. Marine Corps to ensure that this program receives sufficient acquisition oversight to eliminate further cost growth and schedule delays.

Close combat lethality task force

In February 2018, the Secretary of Defense established the Close Combat Lethality Task Force (CCLTF), a cross-functional task force charged with improving combat capabilities of infantry formations to increase lethality, survivability, and resiliency on the battlefield. The CCLTF has focused its efforts on reforming manpower policy, improving training, and fielding cutting-edge equipment and weapons systems for these formations. These efforts are particularly noteworthy as technology proliferation has eroded the comparative advantage of these forces, and, with renewed great power competition, it is imperative that the Department of Defense focus on investments that support close combat formations that historically account for the majority of U.S. casualties.

Therefore, the committee urges the Department to continue its support of the CCLTF, including through sufficient resourcing of the task force and by maintaining the exceptional quality of its leadership as well as the direct reporting relationship to the Secretary of Defense and the Deputy Secretary of Defense.

Columbia-class schedule

The committee continues to have great interest in actions taken by the Department of Defense (DOD) to develop, build, and deploy *Columbia*-class ballistic missile submarines.

The committee notes that a Government Accountability Office (GAO) report, published on April 8, 2019, titled “*Columbia* Class Submarine: Overly Optimistic Cost Estimate Will Likely Lead To Budget Increases” (GAO-19-947), found that challenges with critical new systems, including the integrated power system and common missile compartment, have eroded available lead ship schedule margin such that there is less time available to address issues without resulting in overall lead ship schedule delays.

The committee is concerned by these challenges, as well as several other findings in this report, and the associated potential for delays in delivering the lead ship of the *Columbia*-class in fiscal year 2028 and deploying the lead ship in fiscal year 2031.

The committee also notes that the GAO published a report on June 6, 2018, titled “Navy Shipbuilding: Past Performance Provides Valuable Lessons for Future Investments” (GAO-18-238SP), which assessed Navy shipbuilding performance over the past 10 years and found that each of the 8 most recently delivered lead combatant ships (CVN-78, DDG-1000, LCS-1, LCS-2, LHA-6, LPD-17, SSN-774, and SSN-775) was delivered to the fleet at least 6 months late and 5 of these 8 lead ships were delayed by more than 2 years.

Therefore, not later than December 1, 2019, the committee directs the Secretary of the Navy to submit a report to the congressional defense committees on the *Columbia*-class schedule and impact of potential lead ship delays. The report shall include a description of the: (1) Current schedule margin and critical path(s) for the lead ship in order to meet planned delivery and deployment dates; (2) Potential risks to the lead ship schedule, including the associated potential schedule impact for each such risk; (3) Potential operational impacts, shipbuilding impacts, and mitigation options if the lead ship delivery date is delayed by 6 months, 12 months, 2 years, or 3 years; and (4) Recommendations for congressional or DOD action to reduce the likelihood or mitigate the impact of potential lead ship schedule delays.

DOD efforts to improve friendly force identification

The committee acknowledges that the inadvertent loss of U.S. military personnel to friendly fire is a long-standing and tragic reality of military operations, including ongoing operations in Afghanistan and Iraq. While the Department of Defense (DOD) has made strides in processes and technologies to help distinguish between friendly and enemy forces, incidents of friendly fire continue to exist. The committee is aware that joint terminal air controllers use a variety of friendly force identification systems in close air support operations and that the DOD continues to seek improve-

ments in its ability to identify friendly forces. The committee is also concerned that ongoing efforts by the DOD to upgrade these capabilities are not being adequately coordinated or synchronized to ensure the expeditious integration of new technologies and the interoperability of these systems as they are fielded. Accordingly, the committee directs the Comptroller General of the United States to evaluate the following issues:

(1) What actions has the DOD taken to ensure a common understanding of requirements and challenges related to friendly force identification by close air support aircraft, including visibility over ongoing efforts to meet those requirements;

(2) What efforts does the DOD have underway to enhance its friendly force identification capabilities, to include efforts to identify, evaluate, and incorporate new technologies in an expeditious and cost-effective manner;

(3) To what extent does the DOD coordinate and communicate friendly force identification requirements and evaluations to ensure that the programs it is developing are complementary and interoperable; and

(4) Any other issues that the Comptroller General determines appropriate with respect to efforts to improve DOD's ability to identify friendly forces and minimize friendly fire incidents.

The committee further directs the Comptroller General to provide a report to the congressional defense committees not later than 270 days after the date of the enactment of this Act.

Future Vertical Lift Capability Set 3 potential acceleration

The budget request included \$31.9 million in PE 63801A within Research, Development, Test, and Evaluation (RDT&E), Army for the continued development of the Future Long Range Assault Aircraft (FLRAA) as part of the Army's Future Vertical Lift (FVL) family of systems. The FVL family of systems consists of aircraft across five capability sets based on size, and the FLRAA effort is capability set three.

The committee understands that the FLRAA platform will replace a portion of the Army's utility helicopter fleet to provide considerable capability improvements in speed, range, agility, endurance, and sustainability as compared to current legacy utility helicopters. The committee notes that the current acquisition strategy for the FLRAA represents a traditional approach. However, the committee understands that the Army is considering multiple courses of action to accelerate this program through the use of acquisition reform authorities. Further, the committee understands that the Army is nearing completion of the Joint Multi-Role Technology Demonstration (JMR-TD) effort that successfully demonstrated several transformational vertical lift capabilities and technologies.

Given the substantial investment and knowledge gained by the successful JMR-TD, the committee expects the Army to possess a much better understanding of the technology readiness levels required for the FLRAA development program. As such, the committee believes that the Army should be in a position to reasonably accelerate the FLRAA schedule and acquisition strategy. The com-

mittee encourages the Secretary of the Army to consider using a more tailored acquisition approach for the FLRAA program, to include developing prototypes to expedite the procurement of critical technologies. The committee expects that, following any such prototyping effort, the Army would pursue a follow-on production contract using competitive procedures.

Therefore, the committee directs the Secretary of the Army to provide a briefing, not later than October 1, 2019, to the Committees on Armed Services of the Senate and House of Representatives that details a course of action to accelerate the FLRAA program, to include potential use of tailored acquisition strategies, procedures, and authorities with appropriate oversight, management, and technical rigor.

Global Broadcast System Technologies

The committee recognizes that new Global Broadcast System (GBS) technologies and services may be able to augment satellite communication (SATCOM) bandwidth for the warfighter at both home-base and deployed locations where users continue to struggle with congested networks. The GBS is a critical element of the Department of Defense's (DOD) Intelligence, Surveillance, and Reconnaissance capability and, though its primary focus has been to transmit full motion video from unmanned aircraft systems to tactically deployed forces, it could have value for all types of data needed by the warfighter in a deployed or garrison environment. Portable, rucksack GBS systems could provide a cost-effective way of supporting those goals as the DOD moves into a new era of hybrid SATCOM networks, the innovative use of GBS should be considered as the Department decides on how to provide a holistic solution.

The committee encourages the DOD to procure and rapidly field commercially-available, secure Satellite Portable Receive Suites and Rucksack Portable Receive Suites to test their ability and contribute to meeting communications requirements for deployed warfighter operations as well as base installation operational training activities.

Guided missile frigate (FFG(X))

The committee applauds the Navy's decision to procure a guided missile frigate (FFG(X)) with increased lethality, survivability, and endurance to meet the requirement for Small Surface Combatants in the most recent Navy Force Structure Assessment. While maintaining the Navy's "high/low" mix of ships, the FFG(X) program greatly expands upon the capabilities of the Littoral Combat Ship program, returning to the force and improving on many of the multi-mission warfighting attributes of *Oliver Hazard Perry*-class frigates, including the ability to operate in more contested environments.

As the Navy prepares to issue the FFG(X) request for proposals, the committee continues to support a full and open competition with a single source detail design and construction award in fiscal year 2020. The committee also supports the Navy's approach to commonality with existing Navy platforms, such as the Mark-41 Vertical Launch System and Enterprise Air Surveillance Radar, to

reduce acquisition and sustainment costs. The committee encourages the Navy not to sacrifice warfighting capability for other considerations.

Improved Turbine Engine Program

The Improved Turbine Engine Program (ITEP) is an acquisition program to develop a more powerful engine that would enhance performance at high altitudes and at elevated temperatures while improving operational readiness of the current UH-60 Blackhawk and AH-64 Apache helicopter fleets. The ITEP also has a goal to improve fuel efficiency, which will ease the mission of sustainment forces.

The committee notes that this program represents a cost-effective approach to modernizing aviation assets. Therefore, the committee encourages the Army to pursue opportunities to accelerate the fielding of this capability.

Improving Air Force acquisition and sustainment processes

The committee notes that the Air Force has identified acquisition reform as a key priority and has made progress in taking advantage of authorities that the Congress has provided in recent National Defense Authorization Acts to accelerate prototyping and experimentation. The Air Force reports that it has cut 93 years from previous program schedules, and it cites this as a positive indicator of progress toward the goal of reducing timelines and enabling more agile fielding of systems and technology.

The committee supports the Air Force's effort to fully use authorities provided by the Congress to improve its acquisition processes while ensuring that proper internal and external oversight over programs is maintained, deployed systems are operationally effective and suitable, and systems are developed, deployed, and sustained in the most cost-effective and efficient manner. The committee encourages the Air Force to continue focusing on improvements in these areas while leveraging proven methods to accelerate acquisition and sustainment across the total enterprise.

Marine Corps nano vertical takeoff and landing unmanned aerial systems

The Marine Corps has indicated a need for Nano Vertical Takeoff and Landing Unmanned Aerial Systems for the purpose of providing individual squads with an airborne intelligence, surveillance, and reconnaissance (ISR) capability with real time video and imagery of the tactical environment. The Army is pursuing a similar solution, the Soldier Borne Sensor program, for its squads and small units. The committee encourages the Marine Corps to review the Army's effort, which may help facilitate development of an ISR capability that can increase the lethality and survivability of Marine Corps squads.

Metrics for evaluating potential impacts to airspace

The committee is aware of ongoing discussions with individual project developers, military installations, and the Services regarding proposed energy projects and potential conflicts with military airspace needs. The committee urges the Department of Defense to

also initiate non-project-specific policy-level discussions with industry, affected military installations, and military service leadership to develop clearly defined, objective criteria, measures, and metrics that provide guidance as to when potential impacts to airspace rise to unacceptable levels. This will help installations assess proposed projects and assist industry in avoiding areas of concern.

Mobile aircrew restraint system

The committee noted in the the Senate report accompanying S. 1519 (S. Rept. 115–125) of the National Defense Authorization Act for Fiscal Year 2018 that the use of the Mobile Aircrew Restraint System (MARS) by the U.S. Air Force on its fleet of HH–60 aircraft is to provide survivability improvements over legacy restraint systems. The committee encouraged the U.S. Army to utilize available testing and approval data from the Air Force for incorporation into the UH–60 aircraft fleet. However, there has been little progress on the potential incorporation of the MARS on the Army’s UH–60 fleet.

Therefore, the committee directs the Secretary of the Army to provide a briefing, not later than October 1, 2019, on the MARS, including: the status of the Army’s Airworthiness Release (AWR) on the use of MARS, potential costs to implement AWR modifications, and the timeline to execute AWR implementation.

Modular rugged power devices

The committee notes that National Guard units are frequently deployed to assist with emergency management situations, including responding to natural disasters. Often in these circumstances, the deployed servicemembers cannot depend upon the established electrical grid for energy needs in support of the mission, and mobile power generation is critical to support their operations. Therefore, the committee encourages the Chief of the National Guard Bureau to consider acquiring modular rugged power devices that are self-contained and lightweight zero-emission power generation systems to meet equipping and energy needs.

Mounted A–PNT solutions

Assured Positioning, Navigation, and Timing (A–PNT) solutions are critical to the warfighter due to the reliance of military systems on the Global Positioning System (GPS) and the ability of near-peer competitors to deny or disrupt access to GPS. In order to address this challenge, the Army has established a cross-functional team for A–PNT to ensure that the Army’s ground maneuver forces have access to trusted PNT information even in a GPS-denied environment.

The committee understands that the Army has made progress in the fielding of a Mounted A–PNT solution (MAPS) for Army ground platforms and encourages the Army to field the most capable solution as quickly as possible. The committee directs the Secretary of the Army to provide a briefing to the congressional defense committees by October 1, 2019, on the status of the Army’s MAPS program to include fielding timelines, system capabilities, and how the system will be scalable and compatible with future upgrades.

MQ-1 Gray Eagle briefing

The committee notes the significant capability that the MQ-1 Gray Eagle fleet of unmanned aircraft systems (UAS) provides to the Army. This capability is game-changing and reduces risk for Army soldiers by providing extended surveillance coverage and the ability to self-transit to distant locations by virtue of its long endurance and ease of use, itself deriving from its automatic takeoff and landing system, which the aircraft to be launched and recovered with minimal operator interaction.

The current fleet consists of over 200 Gray Eagle aircraft, half of which are the original configuration and the other half are the Gray Eagle Extended Range (GE-ER) configuration. The GE-ER is the next-generation advanced derivative, providing longer-endurance UAS surveillance, communications relay, and weapons delivery missions in support of maneuver.

However, the committee is concerned that a mixed fleet of Gray Eagle aircraft may not be sufficient to meeting ever increasing operational requirements.

Therefore, the committee directs the Secretary of the Army to provide a briefing, not later than October 1, 2019, to the Senate Armed Services Committee on the capabilities and capacity of the MQ-1 Gray Eagle fleet. The briefing shall include:

- (1) A fleet optimization plan to meet long-term surveillance requirements in multi-domain operations in support of the National Defense Strategy;
- (2) Potential readiness impacts to the Army of operating a mixed fleet of Gray Eagle aircraft; and
- (3) Cost-benefit analysis comparing operations of the current mixed fleet of aircraft to operations of a pure GE-ER fleet.

Multiyear block buy for F-35

The committee notes that both the production and sustainment costs for the F-35 program continue to decrease. However, the committee believes that further savings may be realized through multiyear block buy contracts.

Therefore, the committee directs the Under Secretary of Defense for Acquisition and Sustainment, no later than February 1, 2020, to deliver a report to the congressional defense committees that examines the business case for a combined domestic and international 3-to-5 year multiyear contract for procurement of the F-35A/B/C, beginning with Lot 15. The report shall include: analysis of the appropriate government furnished equipment, such as propulsion systems savings; an assessment of the design stability and technical risk, given the Block 4 changes introduced to the baseline beginning in Lot 15; and an evaluation of the potential to achieve significant net savings for the Department of Defense and international partners through economies of scale. Additionally, the report shall articulate the optimal multiyear contract length for the F-35.

Operational energy of generator sets

Generator sets used by the Services supply critical power that supports the Army's top modernization priorities to make its soldiers and units more lethal. The committee is pleased with Depart-

ment of Defense (DOD) efforts to increase fuel efficiency, improve combat capability, decrease tactical risk, and reduce the cost of generators. Specifically, the committee is encouraged by efforts to reduce fuel requirements by eliminating the need to operate redundant generator sets.

The Army and Marine Corps are incorporating microgrid control capability on all current 30kW to 60kW generator set models, which automatically start and stop generator sets based on load demand. This capability increases fuel savings for the DOD and improves system-level reliability. The committee also encourages the Services to incorporate an energy storage module with generator sets to provide more energy-efficient power. This ability will further increase system efficiency and reliability, decrease maintenance frequency, enable silent watch operations, and facilitate integration of renewable energy sources.

Persistent Intelligence, Surveillance and Reconnaissance (ISR) and heavy payloads

The committee remains concerned that the combatant commands are not being given sufficient airborne intelligence, surveillance, and reconnaissance (ISR) support assets to adequately provide force protection, situational awareness, maritime domain awareness (MDA), combat identification, high-precision geolocation, and other necessary capabilities to support deployed forces as they execute missions. In their respective testimonies before the Senate Armed Services Committee, the Combatant Commanders of U.S. Africa Command (AFRICOM), U.S. European Command (EUCOM), U.S. Indo-Pacific Command (INDO-PACOM), and U.S. Southern Command (SOUTHCOM) all stated that they have significant gaps between ISR requirements and ISR capacity.

Increased ISR could enhance AFRICOM's Counter-Violent Extremist Organizations missions, EUCOM's European Deterrence Initiative (EDI), INDO-PACOM's MDA, and SOUTHCOM's counter-narcotics missions. The Commander of INDO-PACOM stated that "ISR is a critical need in the region" and that "less than half of my requirements are served by the ISR that's available in the region." The Commander of SOUTHCOM testified that SOUTHCOM is "deficient in [its] ISR for the counter-narcotics mission." He further stated that the Joint Interagency Task Force South (JIATFS) only interdicted about six percent of known drug movements. The committee agrees with the testimony of the Commander of EUCOM—that there is a global shortage of high demand, low density assets and that there may be commercial technologies that could help mitigate the capability gaps.

The committee notes that there are commercial technologies in development that could help address many of the combatant commands' ISR gaps. Heavy payload, solar-powered unmanned aerial vehicles (UAV) are being developed that, because of their unique power source and electric engines, may be able to operate aloft and on station in an enduring, quiet, and persistent manner. These systems present the possibility of basing in friendly territory and deployment in advance of planned missions to provide ISR pre-mission, during the mission, and post-mission. Some solar-powered candidate systems have modular designs and payload capacities of

more than 300 pounds. These assets may be able to serve as a multi-intelligence platform able to provide agile sensor suites in response to mission requirements.

The technological challenge to realizing the potential of such systems would be developing payloads that have overall dependability and sufficient reliability to stay aloft and continue performing missions for long periods of time. Such reliability is not usually found in current airborne ISR systems.

The committee supports additional resources for payload improvements and to evaluate a persistent, quiet, heavy payload, solar-powered, multi-intelligence ISR asset.

Personal recovery devices for servicemembers

As the Army pivots to great power competition and multi-domain operations, Assured-Position, Navigation, and Timing (A-PNT) technologies will be critical in enabling the U.S. military to conduct operations in a Global Positioning System-contested environment. Furthermore, the Personnel Recovery Support System (PRSS), which includes the PRSS 1b Secure Personal Locator Beacon, can leverage A-PNT technology to assist in the location of missing and captured servicemembers on the battlefield.

The committee supports the Army's initial procurement and deployment of a personal recovery device that can operate in GPS-denied or -degraded environments. In addition, the committee notes the Army has stood up a cross-functional team to rapidly assess material development solutions to address the A-PNT mission area and potential capability gaps. Therefore, the committee encourages the Army to continue investment and deployment of proven A-PNT solutions and PRSSs.

Reliability growth of systems on Ford-class aircraft carriers

The committee notes that the Government Accountability Office (GAO) published a report on June 6, 2018, titled "Navy Shipbuilding: Past Performance Provides Valuable Lessons for Future Investments" (GAO-18-238SP), which assessed Navy shipbuilding performance over the past 10 years and concluded that ". . . the Navy's shipbuilding programs have had years of construction delays and, even when the ships eventually reached the fleet, they often fell short of quality and performance expectations."

The committee is concerned that Navy ships are being delivered to the fleet with incomplete and underperforming systems, which often leads to the reliability of key systems falling short of Navy requirements.

The reliability of key systems on the lead ship in the Ford-class of aircraft carriers, USS *Gerald R. Ford* (CVN-78), is particularly concerning. While the Navy accepted delivery of CVN-78 from the shipbuilder in May 2017, 20 months later than initially planned, reliability measured through September 30, 2018, of four key systems is either orders of magnitude below the Navy's stated requirement or unknown.

As reported by the Department of Defense's Director of Operational Test and Evaluation (DOT&E) in December 2018, through the first 747 shipboard launches, the Electromagnetic Aircraft Launch System (EMALS) suffered 10 critical failures, well below

the requirement of 4,166 mean cycles between critical failures, where a cycle represents the launch of one aircraft. Through the first 763 attempted shipboard landings, the Advanced Arresting Gear (AAG) suffered 10 operational mission failures, well below the re-baselined reliability growth curve and well below the requirement of 16,500 mean cycles between operational mission failures, where a cycle represents the recovery of one aircraft. For the Dual Band Radar (DBR) and Advanced Weapons Elevators (AWE), only engineering reliability estimates, not actual data, have been provided by the Navy to the DOT&E.

The committee is concerned that inadequate reliability of key shipboard systems, such as those on CVN-78, will result in degraded operational performance that will not meet combatant commander needs.

Therefore, beginning on October 1, 2019, the committee directs the Secretary of the Navy to submit quarterly reports to the congressional defense committees on the reliability of the EMALS, AAG, DBR, and AWE until each system meets its full reliability requirement. Each report shall utilize the DOT&E measures and metrics to report measured reliability for each system for the previous fiscal year quarter. Each report shall also include projected reliability growth estimates, in graphical and tabular form, to achieve the Navy's reliability requirement for each system with the associated schedule. In addition, the reports shall include descriptions of actions being taken to improve the reliability of each system.

Report on future force design alternatives for Department of the Air Force

While the committee acknowledges that the Air Force force structure report as directed by section 1064 of the National Defense Authorization Act for Fiscal Year 2018 (Public Law 115-91) recommended that the Air Force grow to 386 squadrons from the current 312, it also observes that this recommendation emerged from analysis using current operations plans and concepts of operations. The committee believes that alternative force designs could significantly change the inventory requirements.

Therefore, the committee directs the Secretary of the Air Force to submit a report to the congressional defense committees, not later than March 1, 2020, on future force design alternatives for the Air Force. The Secretary shall ensure that the report includes the following matters with an accompanying unclassified summary:

- (1) An assessment of the analysis used to conclude that the Air Force requires growth to 386 operational squadrons;
- (2) An assessment of the anticipated global strategic operating environment through 2040;
- (3) Required capabilities and concepts that are common to all future force design alternatives;
- (4) Multi-domain command and control architectures and associated communication capabilities required to effectively implement the future force design;
- (5) Prioritized technologies and prototyping required for development and fielding to support the future force design;

- (6) Other capabilities and capacities required for the Air Force to be an effective joint and coalition warfighting partner; and
- (7) Other matters that the Secretary considers relevant for future force designs.

Report on impact to force structure of using aircraft for missile defense

The committee notes that the 2019 Missile Defense Review (MDR) tasked the Secretary of the Air Force and the Director of the Missile Defense Agency to deliver a report on how best to integrate the F-35 into the missile defense system for both regional and homeland defense. The committee is concerned that the potential use of air assets to meet theater missile defense requirements could put additional mission demand on an already limited force structure and is not accounted for in the current Air Force force structure planning.

Therefore, the committee directs the Secretary of the Air Force to conduct a study on how this additional mission requirement would change combatant commander requests for forces, including impacts to basing and Time Phased Force Development Data in current war plans. The Secretary shall provide a report consisting of the findings of this study to the congressional defense committees no later than January 1, 2020.

Robotics and autonomous systems

The committee recognizes the importance and growing role of robotics and autonomous systems on the battlefield. For example, the committee acknowledges that the Army's Robotic and Autonomous Systems Strategy and the Functional Concept for Movement and Maneuver identifies robotic systems as a critical enabling technology. Further, the committee understands that these capabilities at the Brigade Combat Team level may facilitate the effective execution of missions in a contested multi-domain environment.

With the establishment of cross functional teams and Army Futures Command, the Army is bringing various Department of Defense stakeholders together to explore concepts, ideas, and develop potential solutions. The committee urges the Army to continue creating opportunities to explore options in the advancement of emerging robotic and autonomous technologies for fielding at echelon across all of its warfighting functions.

Therefore, the committee directs the Secretary of the Army to provide a briefing, not later than October 1, 2019, on robotics and autonomous systems to the Senate Armed Services Committee. The briefing shall include:

- (1) The feasibility, acceptability, and suitability of establishing a Robotic Development Center nested within the Army's Maneuver Center of Excellence; and
- (2) The current and future plans to build partnerships with institutions of higher education, government laboratories, and industry in order to lead the integrated development of prototypes.

Size, weight, power reductions of naval combat systems

The committee understands that the Navy and Marine Corps are interested in options to reduce the size, weight, and power (SWaP) of mission systems. By migrating applications from multiple under-utilized servers to fewer optimally-utilized physical servers, the Navy may be able to significantly reduce footprint, hardware costs, energy costs, and sustainment costs.

To fully understand the potential opportunity of SWaP reductions in mission systems, the committee directs the Secretary of the Navy to provide a briefing to the Senate Armed Services Committee, not later than October 1, 2019, on the Department of the Navy's efforts to reduce the SWaP of such systems. The briefing shall include, at a minimum: (1) A description of ongoing SWaP reduction efforts for mission systems; (2) An analysis by the Program Executive Office for Integrated Warfare Systems (PEO IWS) of programs and projects that could be virtualized on existing PEO IWS hardware baselines; (3) An evaluation of the Navy's ability to virtualize and consolidate existing warfare systems onto virtual platforms; (4) An assessment of the Navy's ability to migrate applications to platforms that utilize "cloud"-type technology; and (5) An estimation of savings that could be achieved through SWaP reduction efforts.

Small-Unit Support Vehicle replacement

As the Department of Defense pivots to addressing the demands of great-power competition, the committee understands that the military must refocus on operating in a cold-weather environment. The committee acknowledges that the Small-Unit Support Vehicle (SUSV) is uniquely capable of supporting maneuver forces in cold-weather and off-road operations. With the capacity to transport 14 personnel and a footprint of just 1.8 pounds per square inch, the SUSV is extremely well-equipped to traverse difficult terrain such as deep snow, tundra, mud, swamps, and wetlands.

However, as the SUSV ages, the readiness and cost of maintaining the fleet of 30-year-old vehicles may become unsustainable. The committee notes the U.S. Army's recent decision to approve the Cold-Weather All-Terrain Vehicle as the replacement for the SUSV. The committee encourages the Army to procure its entire 163-vehicle Army Acquisition Objective and consider further fielding to attain a fleet similar in size to the SUSV's original fleet size. Finally, the committee encourages other military services to consider joining the Army's procurement in order to meet their cold-weather, all-terrain vehicle transport needs.

Submarine industrial base and parts availability

The committee commends the Navy on its efforts to evaluate and improve material demand visibility from submarine public shipyards. The committee is aware that the lack of material availability for *Virginia*-class submarine maintenance has contributed to an increased reliance on cannibalization of material from operational platforms, consequently decreasing readiness. The committee is also aware of efforts to improve and forecast material demand, which would enable more timely procurement actions to support the public shipyards.

The committee encourages the Navy to better communicate the capability of their submarine forecasting model and its impact on material obsolescence and manufacturing capability in industry to the Committees on Armed Services of the Senate and the House of Representatives. The committee also encourages the Navy to communicate needs in a timely fashion, such as a need for Research, Development, Test, and Evaluation funding, in order to further reduce material and parts availability issues at public shipyards.

The committee encourages the Secretary of Defense to support shipbuilding industrial base initiatives in order to maintain readiness and a strong submarine industrial base.

Supporting and expanding the submarine sub-contracting industrial base

The committee believes that expanding the capability and capacity of the submarine industrial base workforce is imperative to keeping pace with Navy shipbuilding requirements. Numerous manufacturing capabilities must be addressed, including the need for more qualified and Navy-certified welders.

The committee is concerned that the Navy-certified welding workforce may be insufficient to meet Navy demands on time with the required quality. The committee understands that Navy-certified welders must undergo significant training and possess a higher level of job skills compared to the standard welding workforce. The committee further understands that the welding of high strength submarine steel requires welders to be qualified to MIL-STD-1688 and that this work must be performed in Navy-certified facilities.

The committee is aware of the need to support the specific skill sets necessary to enable the Navy to achieve the submarine build plan. The committee encourages the Navy to conduct a thorough assessment of the current workforce and produce a plan for closing the gaps in capability and capacity.

Survivable artillery

The committee understands that there is a need for self-propelled, survivable 155mm and 105mm howitzer solutions that can emplace, fire, and displace rapidly enough to evade enemy counter-battery fires. The committee strongly encourages Army leaders to allocate funds to acquire both systems in sufficient quantity to address the requesting units' immediate needs and to further initiate an Army-wide fielding of these enhanced capabilities. Light, self-propelled 155mm and 105mm artillery systems will substantially improve the deterrence posture of the U.S. Army and allied armies in Europe and Asia that will face sophisticated, quick-fire counter-battery systems in the event of a conflict.

Tactical wheeled vehicle industrial base

The committee is concerned that the fiscal year 2020 budget request reduced funding from what was planned in the future years defense program for the majority of the Army's tactical wheeled vehicle fleets, including the Joint Light Tactical Vehicles, the Family of Medium Tactical Vehicles, and the Heavy Expanded Mobile Tactical Trucks. The committee acknowledges that reducing funding

across the light, medium, and heavy tactical wheeled vehicle fleet could threaten the fragile networks of suppliers, many of which are small businesses. Such businesses may be forced to exit the defense industry or cease operations altogether. In addition, if production does not support minimum sustaining rates for the tactical wheeled vehicle industrial base, it would impact overall readiness rates by reducing the availability of parts and spares.

Therefore, the committee encourages the Army to pursue predictable funding levels in the future for the tactical wheeled vehicle industrial base in order to avoid production breaks that could adversely impact Army readiness and modernization efforts.

TH-57 replacement

The committee supports the replacement of the Department of the Navy's current fleet of TH-57 training helicopters with the Advanced Helicopter Training System, included in the President's budget request, to ensure continued training of the student naval aviators in the Navy, Marine Corps, and Coast Guard. The committee strongly encourages the Secretary of the Navy to ensure predictable and sufficient funding through the future years defense program and to work to expedite procurement of the Advanced Helicopter Training System aircraft, thereby ensuring that rotary-wing training is not interrupted.

UH-1N replacement

The committee supports the procurement and fielding of the MH-139 aircraft as the replacement for the UH-1N. The committee notes that the contract for up to 84 helicopters, training devices and associated support equipment, and operations, maintenance, training systems, and support equipment is valued at \$2.4 billion. The committee also understands that the fielding of the MH-139 will close significant mission capability gaps associated with the current fleet of UH-1N aircraft. The committee strongly encourages the Secretary of the Air Force to maintain predictable and sufficient funding through the future years defense program, ensuring that the critical missions of nuclear deterrence and transportation of U.S. government and security forces are executed. The committee also encourages the Air Force to consider expediting procurement of the MH-139 aircraft.

Therefore, the committee directs the Secretary of the Air Force to provide a briefing to the congressional defense committees on the UH-1N replacement program by October 1, 2019. That briefing shall include information on the following topics:

- (1) The timeline for procurement and fielding of the MH-139 at Minuteman III bases;
- (2) Any military construction projects needed to field the helicopter and cost and schedule for any such projects;
- (3) The program costs to procure and operate the MH-139 fleet; and
- (4) The implications of potential program delay for procurement or operating and support costs.

Unmanned aerial systems training locations

The committee recognizes the vital importance of providing the best trained unmanned aerial systems (UAS) operators and maintainers in order to meet operational and training requirements in support of the National Defense Strategy. In order to meet the unique and specific training requirements for UAS operations, the Army needs training locations that possesses dedicated restricted air space, favorable weather conditions, access to large military operating areas, varied types of terrain, and available spectrum.

Therefore, as the Army conducts its assessment of the best possible locations for UAS training, the committee encourages the Secretary of the Army to consider the attributes to select a training location that: (1) Best meets the requirements of training; and (2) Possesses the capability to increase throughput for both initial qualification and unit training. Further, before any assessment progresses to a stage where specific courses of action are being evaluated, the committee directs the Army to provide a briefing to the congressional defense committees on specific criteria that will be used to conduct the assessment.

Vehicle Reconnaissance System

The committee is encouraged by the Army's recent award of the Soldier Borne Sensor (SBS) program. The committee has been supportive of this program due to the significant need to provide squads and small units with enhanced intelligence, surveillance, and reconnaissance (ISR) capabilities.

The committee is interested in how this program could further increase situational awareness in ground combat vehicle operations. Specifically, the committee is interested in the potential for adapting the SBS technology to develop a vehicle reconnaissance system for use on-board ground combat vehicles and unmanned vehicles. Such a system would allow for on-demand ISR ahead of vehicles and convoys on the move and around stationary vehicles.

Therefore, the committee directs the Secretaries of the Army and Navy to brief the congressional defense committees, not later than February 1, 2020, on existing plans for incorporating a vehicle reconnaissance system into both manned and unmanned ground combat vehicles. At a minimum, this briefing should include an assessment of current technologies being examined and other efforts for incorporating such systems on current and future vehicle platforms.

Virginia-class hull treatment briefing

The committee is aware of press reporting from 2011 and 2017 that indicated problems with *Virginia*-class submarine hull treatments, including delamination.

The committee is concerned that the *Virginia*-class submarine program may continue to experience challenges with hull treatments, including with the "Mold-in-Place" (MIP) material.

Therefore the committee directs the Secretary of the Navy, not later than October 1, 2019, to provide a briefing to the Senate Armed Services Committee that describes the following related to the *Virginia*-class submarine program: (1) Past and current challenges with hull treatments; (2) Percentage of original hull treat-

ment remaining on each delivered *Virginia*-class submarine; (3) Cost of MIP repair and replacement by *Virginia*-class submarine hull number; (4) Assessment of the operational implications of degraded hull treatments, specifically reduced MIP coverage, including interruptions of operational tasking; (5) Root causes and corrective actions for hull treatment deficiencies; and (6) The approach to hull treatments on the *Columbia*-class submarine program.

Western Army Aviation Training Site (WAATS) for FMS

The committee acknowledges that the Western Army Aviation Training Site (WAATS) in Marana, Arizona, is a premier rotary wing training location and is integral to the mission of the U.S. Army Aviation Center of Excellence (USAACE) to provide trained and ready aircrews in support the National Defense Strategy. However, the committee notes that the required increase of U.S. personnel throughput at the USAACE due to pilot shortages in the Active-Duty component, Army National Guard, and Army Reserve limits the available training quotas of foreign military students sent by our allies and partners.

The WAATS currently provides both rated and nonrated crew flight training for both U.S. and foreign military students in UH-60 Blackhawk and UH-72 Lakota aircraft courses and possesses excess capacity to assist USAACE throughput. Additionally, the WAATS provides hundreds of square miles of airspace specifically dedicated to aviation training and an above average number of days allowing flight operations.

Therefore, the committee requires the Secretary of the Army to brief the Senate Armed Services Committee, not later than October, 1, 2019, on the aviation training at the WAATS and include the:

- (1) Forecasted schedule for UH-60 and UH-72 flight training courses in fiscal years 2020–2023;
- (2) Feasibility and suitability of the WAATS to conduct all foreign military flight training for UH-60 and UH-72 courses;
- (3) Excess capacity at the WAATS, including classrooms, simulators, hangar space, and aircraft parking; and
- (4) Potential expansion of training missions at the WAATS.

