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(COMPTROLLER)/CHIEF FINANCIAL OFFICER
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Program Acquisition Cost By Weapon System

UNITED STATES DEPARTMENT OF DEFENSE
FISCAL YEAR 2020 BUDGET REQUEST

The estimated cost of this report or study for the Department of Defense is approximately \$36,000 for the 2019 Fiscal Year. This includes \$11,000 in expenses and \$25,000 in DoD labor.

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Major Weapon Systems

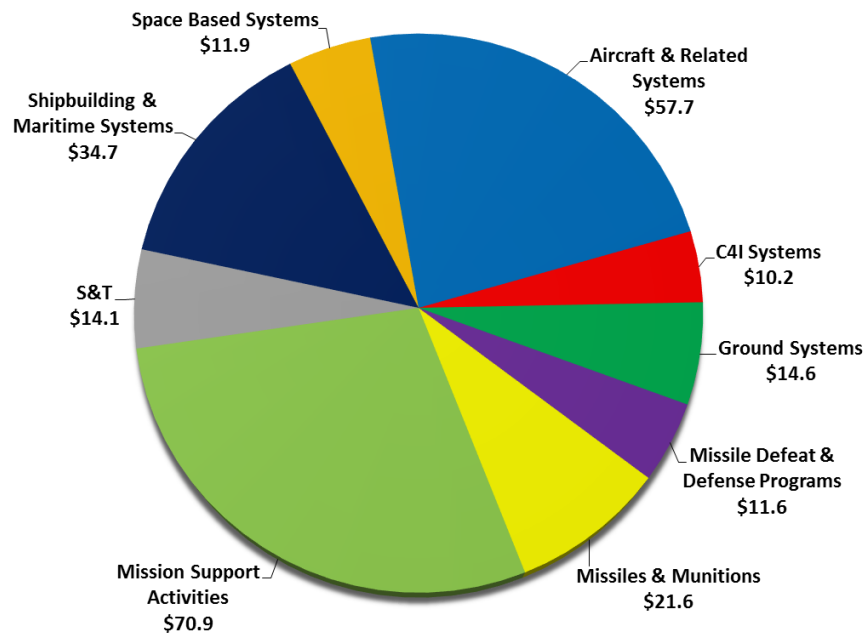
Overview

The performance of United States (U.S.) weapon systems are unmatched, ensuring that U.S. military forces have a tactical combat advantage over any adversary in any environmental situation. The Fiscal Year (FY) 2020 acquisition (Procurement and Research, Development, Test, and Evaluation (RDT&E)) funding requested by the Department of Defense (DoD) totals \$247.3 billion, which includes funding in the Base budget and the Overseas Contingency Operations (OCO) fund, totaling \$143.1 billion for Procurement and \$104.3 billion for RDT&E. The funding in the budget request represents a balanced portfolio approach to implement the military force objective established by the National Defense Strategy. Of the \$247.3 billion in the request, \$83.9 billion finances Major Defense Acquisition Programs (MDAPs), which are acquisition programs that exceed a cost threshold established by the Under Secretary of Defense for Acquisition and Sustainment. To simplify the display of the various weapon systems, this book is organized by the following mission area categories:

- Aircraft and Related Systems
- Command, Control, Communications, Computers, and Intelligence (C4I) Systems
- Ground Systems
- Missile Defeat and Defense Programs
- Missiles and Munitions
- Shipbuilding and Maritime Systems
- Space Based Systems
- Science and Technology
- Mission Support Activities

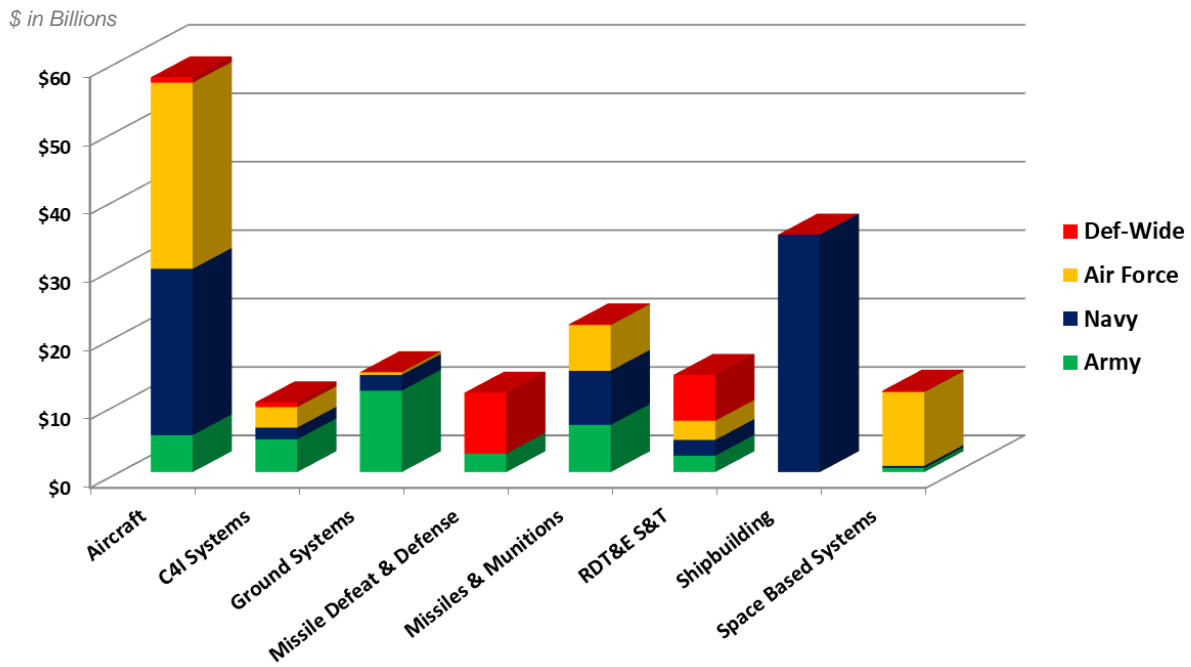
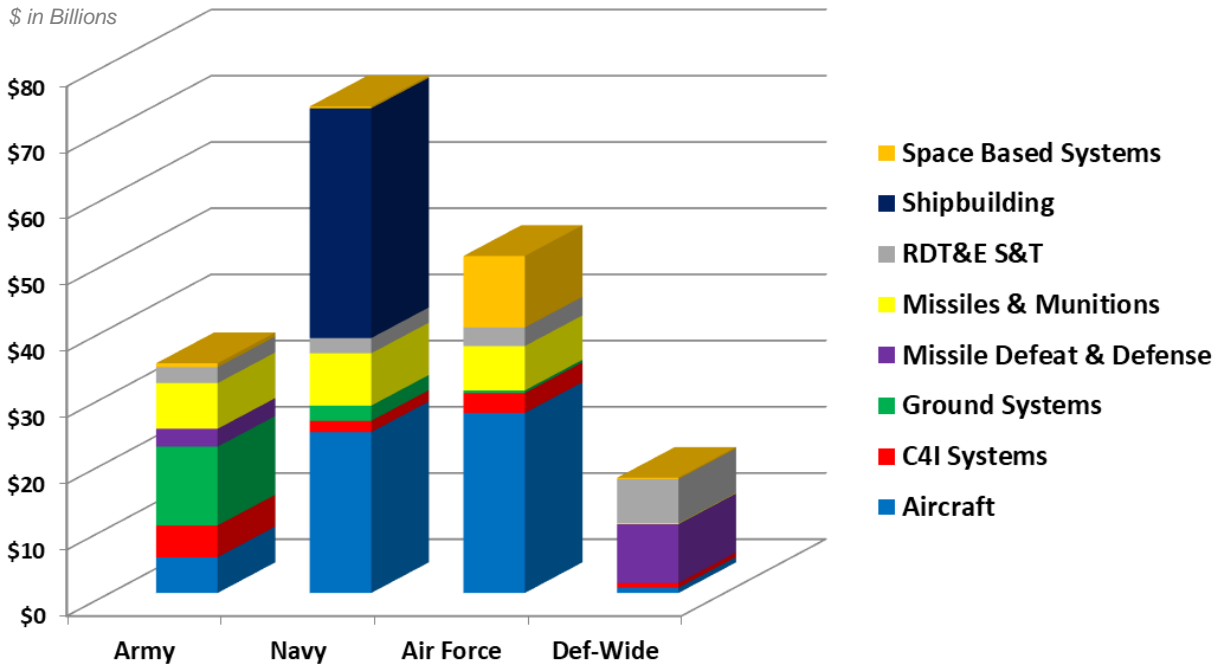
FY 2020 Investment Total: \$247.3 Billion

\$ in Billions



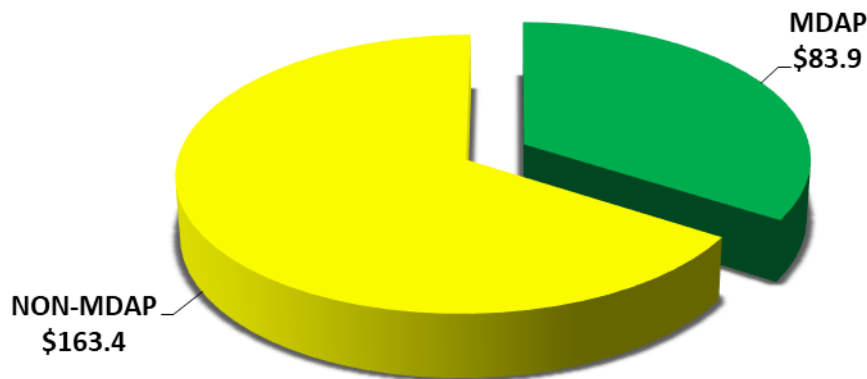
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The Distribution of Funding in FY 2020 for Procurement and RDT&E by Component and Category*



* Funding in Mission Support activities are not represented in the above displays.

Total Requested Procurement and RDT&E Funding During FY 2020, for MDAP* and Non-MDAP Programs



The FY 2020 President’s Budget request for modernization in the RDT&E and Procurement titles is comprised of 2,487 Program, Project, and Activity (PPA) line items. Within this amount, there are 106 Major Defense Acquisition Programs (MDAPs) of which 17 are Pre-MDAPs*. Of the 89 MDAPs, 86 are under direct oversight by the Military Departments – 19 with the Army, 37 with the Navy, and 30 with the Air Force. The remaining 3 programs are currently under the direct oversight of the Under Secretary of Defense (Acquisition and Sustainment).

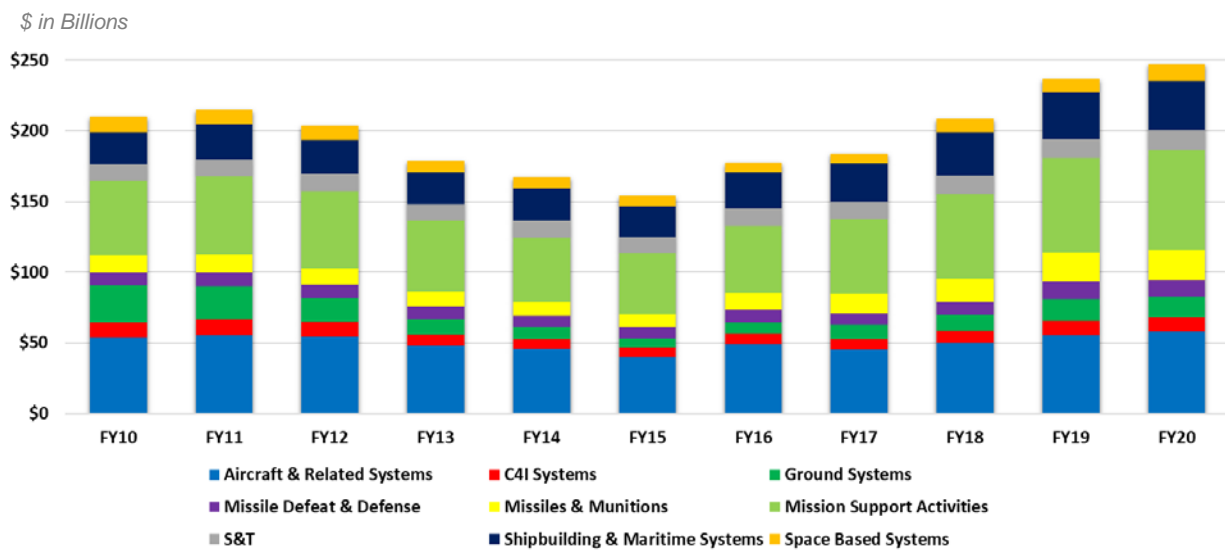
Not all MDAPs (Acquisition Category (ACAT) I) are represented in this book because they fall below reporting criteria.

While non-MDAP individual programs are smaller in dollar value when compared to MDAPs, they account for 66 percent of the total Investment accounts and are essential to development of future technologies and procuring a wide assortment of equipment, munitions, vehicles and weapons needed by combat forces. The MDAPs consume approximately \$83.9 billion, or 34 percent of the FY 2020 modernization funding (\$247.3 billion).

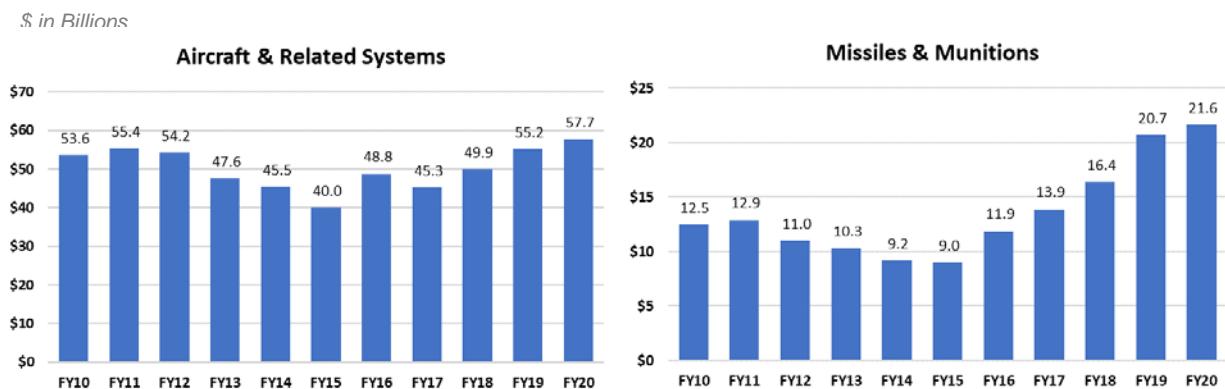
* A MDAP is an acquisition program that is designated by the Under Secretary of Defense for Acquisition and Sustainment (USD (A&S)); or is estimated to require an eventual total expenditure for Research, Development, Test, and Evaluation (RDT&E), including all planned increments, of more than \$480 million in Fiscal Year (FY) 2014 constant dollars or, for Procurement, including all planned increments, of more than \$2.79 billion in FY 2014 constant dollars.

CHANGE IN INVESTMENT Comparison in Funding Since FY 2010

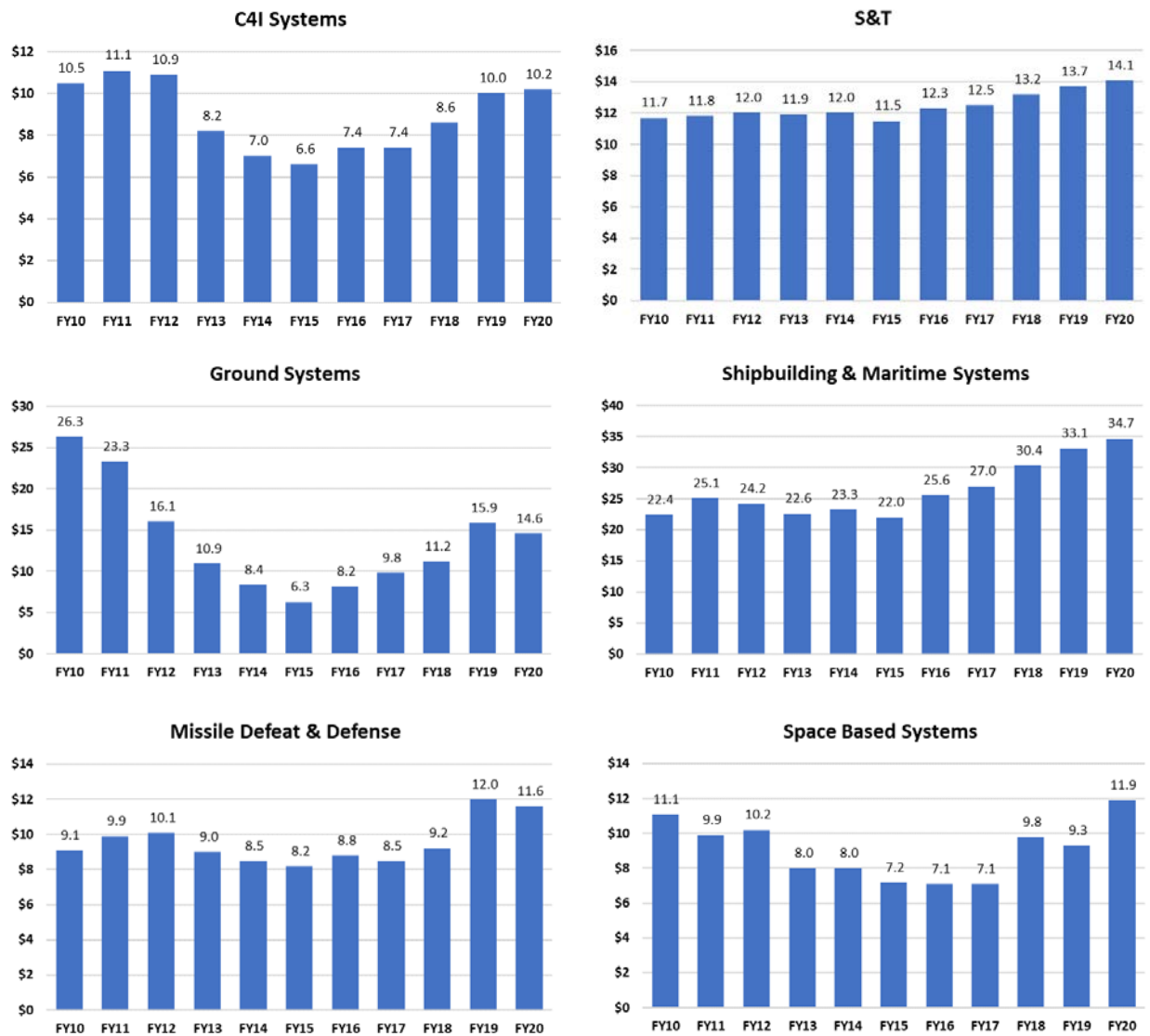
The FY 2020 President’s Budget (PB) includes \$247.3 billion for Research, Development, Test and Evaluation (RDT&E) and Procurement programs. Of this amount, \$104.3 billion finances weapon system development and \$143.1 billion finances equipment and materials acquisition. The FY 2020 request represents a significant increase over what was requested in previous fiscal years. The following charts shows the funding for Investment since the FY 2010 PB request by Mission Area Categories. The FY 2020 request is 61 percent greater than the low point in FY 2015, and demonstrates an increased commitment by the Department to modernize and increase the overall lethality of the U.S. military force, consistent with the National Defense Strategy.



The following charts display the relative change in funding requested for every fiscal year since FY 2010 by Mission Area Categories. The charts clearly demonstrate the increased emphasis in improving lethality by investing in modern weapon systems.



FY 2020 Program Acquisition Costs by Weapon System



Weapon system funding amounts, both for development and procurement, are cyclical in that the level of funding is dependent on national security objectives, military strategy, threat projections, inventory objectives, existing inventory levels, and technology obsolescence. Therefore, the amounts requested in the President’s Budget differ depending on these criteria.

With regard to the overall funding for weapon system development and equipment acquisition across the entire weapon system portfolio, the FY 2020 request represents an increase of 34 percent since FY 2016. The increased funding is consistent with the Department’s goal of operationalizing the National Defense Strategy (NDS) to provide the combat-credible military forces needed for the U.S. to deter or defeat great power adversaries. The FY 2018 request of \$208.6 billion (\$244.9 billion enacted) and the request in FY 2019 of \$236.7 billion (\$240.4 billion enacted) included a significant increases in funding to start reversing the damaging negative trends in modernization from previous fiscal years. The FY 2020 request of \$247.3 billion for RDT&E and Procurement programs builds upon the two preceding fiscal years by fully implementing the NDS blueprint in a truly strategy-driven paradigm.

Congressional Action

In considering the annual appropriations bill for the Department of Defense, Congress often adjusts the budget request. Thus, the amount enacted differs from the amount requested. The following table shows the status for the Procurement and the RDT&E titles after congressional action in FY 2018, FY 2019, and the request for FY 2020.

<i>\$ in Billions</i>	RDT&E	Procurement
FY 2018 President's Budget Request	\$92.4	\$144.3
FY 2018 Actual (amount currently being executed)	\$91.7	\$146.1
FY 2019 PB Request	\$92.4	\$144.3
FY 2019 Enacted (by the Congress)	\$96.0	\$149.0
FY 2019 Rescissions	\$-0.7	\$-1.7
FY 2019 Program	\$95.3	\$147.3
FY 2020 PB Request	\$104.3	\$143.1
Difference: FY 2019 Program and FY 2020 Request	+9.0	-4.2

RDT&E: Increases by \$9.0 billion (+9.4%) above the program amount in FY 2019. The increase is due to a \$2.5 billion growth in funding for aircraft systems development and a \$1.8 billion increase for Space Based systems, primarily associated with the development of a new generation of Global Positioning Systems (GPS) and replacement programs for the Space Based Infrared System (SBIRS) and the Tactical Warning/Attack Assessment (TW/AA) spacecraft. In addition, the FY 2020 request includes \$14.2 billion for Science & Technology (S&T), an increase of \$0.5 billion over the amount in FY 2019. There are also smaller increases totaling \$465 million for various C4I, Ground, Missile Defense, and munitions development programs.

Procurement: Decreases by \$4.2 billion (-2.8%) below the program amount in FY 2019. The decrease is driven by reductions in the F-35 procurement quantities (-15), reductions in the funding for C-130 aircraft (\$-882 million), procuring 3 less KC-46 and 8 less Army's AH-64 attack helicopters. The overall decrease in aircraft procurement is partially offset by the procurement of 8 new F-15 jet fighters (\$+1.1 billion). Procurement also decreases by a total of \$1.4 billion for light tactical vehicles (\$-434 million), combat vehicles (\$-404 million) and support equipment (\$-566 million). Funding for the procurement of ammunition and tactical missiles increases by \$1.5 billion over the amount in FY 2019, which including significant increases allocated for weapons like the Hellfire missile (\$+246.8 million), Guided Multiple Launch Rocket System (GMLRS) (\$+269.8 million) and Small Diameter Bomb II (\$+138.7 million).

Mission Area Categories

This book shows the major weapon systems funded in the FY 2020 President's Budget, organized by Mission Support Activities. Each Mission Area Category chapter heading further breaks out the funding allocation in FY 2020 by subgroups, and provides a summary programmatic and financial description of the major weapon systems within each portfolio.

Aircraft and Related Systems

\$57.7 billion – 23 percent of the Investment budget request

Includes funding for aircraft research and development, aircraft procurement, initial spares, and aircraft support equipment. The single largest defense program, the 5th generation F-35 Joint Strike Fighter (FY 2020 request, \$11.2 billion; includes Modification program) resides in this category. Also in the FY 2020 request are 32 - 4th generation F/A-18E/F (24) and F-15EX (8) aircraft. This reflects the Department's strategy to layer capability to address different threat situations. Against high-end threats, the Navy, Marine Corps and Air Force are procuring 5th generation F-35 jet fighters to address advance technology aircraft being deployed by Russia and China. To defeat lower technology platforms, the Department is procuring additional 4th generation F/A-18E/F and the F-15EX aircraft, which nominally have lower operating costs when compared to 5th generation combat jets such as the F-22 and the F-35. Also in this category is the funding for attack and utility helicopters; Unmanned Aerial System (UAS); manned reconnaissance platforms and systems; the incremental cost for the Presidential Aircraft Recapitalization (PAR) aircraft; as well as future platforms such as the B-21 Long Range Strike Bomber and the Next Generation Air Dominance (6th generation fighter). For display purposes, the Aircraft and Related Systems category includes the following subgroups:

- Combat Aircraft
- Cargo Aircraft
- Support Aircraft
- Unmanned Aerial Vehicle
- Aircraft Modifications
- Aircraft Support
- Technology Development

Command, Control, Communications, Computers, and Intelligence (C4I) Systems

\$10.2 billion – 4 percent of the Investment budget request

Includes funding for various C4I systems, to include command centers; communications gear; air traffic control; night vision equipment; cyber space operations and requirements; data processing equipment; fire control systems; other information technology; and related systems. This category includes funding for a far-reaching number of programs such as Warfighter Information Network-Tactical (WIN-T), Handheld Manpack Small Form Fit (HMS) radio, Joint Regional Security Stacks (JRSS), Information Systems Security Program (ISSP), the Air Force National Airborne Operations Center (NAOC) Recapitalization program, the Navy's Consolidated Afloat Networks and Enterprise Services (CANES), and the Integrated Personnel and Pay System-Army (IPPS-A). For display purposes, the C4I System category includes the following subgroups:

- Automation
- Base Communications

- Information Security & Assurance
- Technology Development
- Theater Combat Command, Control, Computers & Services

Ground Systems

\$14.6 billion – 6 percent of the Investment budget request

Includes funding for combat vehicles, artillery, infantry support weapons, tactical radar systems, tactical and non-tactical vehicles of all types, physical security equipment, logistics and engineer equipment, and research and development of various weapons equipment. This category includes funding for new and upgrades to tactical vehicles, such as the new Armored Multi-Purpose Vehicle (AMPV) for the Army and the Amphibious Combat Vehicle (ACV) for the Marine Corps. It also includes upgrades to the Abrams main battle tank to start bringing the force up to the M1A2C (System Enhancement Package (SEP) V3) configuration and the upgrades to the M109A7 155mm Paladin Integrated Management (PIM) self-propelled artillery vehicle. In addition, the Army is modernizing the tactical wheeled vehicle fleet through new procurement Joint Light Tactical Vehicles (JLTV), engineering changes to Family of Medium Tactical Vehicles (FMTVs), and recapitalization of the Family of Heavy Tactical Vehicles (FHTVs) to continue affordability initiatives. For display purposes, the Ground Systems category includes the following subgroups:

- Combat Vehicles
- Heavy Tactical Vehicles
- Light Tactical Vehicles
- Medium Tactical Vehicles
- Support Equipment
- Weapons

Missile Defeat and Defense Programs

\$11.6 billion – 5 percent of the Investment budget request

Includes funding for the development and Procurement of tactical and strategic ballistic missile defense weapons and systems. This category includes continuation of the Missile Defeat and Defense Enhancement (MDDE) initiative to improve ballistic missile capabilities against existing and future threats. The FY 2020 budget request includes the procurement of additional Standard Missile Block 3 IB and IIA missiles, the Terminal High Altitude Area Defense (THAAD) interceptors, and the continuation of construction of 22 additional missile silos at Fort Greely, Alaska. The procurement of 20 Ground Based Intercept (GBI) "all-up-rounds" will commence after completion of testing of the Redesigned Kill Vehicle (RKV). Once complete, the total number of operational GBIs will be no less than 64. The FY 2020 request also includes funding to assess the feasibility of a space based sensor and ballistic missile intercept capability. This budget continues the Missile Defense Agency (MDA) longstanding support of U.S.-Israeli Cooperative BMD Programs, to include the co-development and co-production of the David's Sling Weapon System and Upper Tier Interceptor, and improvements to the Arrow Weapon System and Iron Dome. For display purposes, the Missile Defense Programs category includes the following subgroups:

- Ballistic Missile Defense System
- Tactical Ballistic Missile Defense
- Tactical Missile Defense

Missiles and Munitions

\$21.6 billion – 9 percent of the Investment budget request

This category includes funding for both conventional ammunition of all types and Precision Guided Munitions (PGM). The ammunition portfolio includes bullets, cartridges, mortars, explosives and artillery projectiles needed mostly by ground forces. The PGM portfolio includes air-to-air, air-to-ground, ground-to-ground, and ground-to-air weapons. The FY 2020 request furthermore reflects the Department's objective to increase the overall lethality of the force by maximum production rates, thus fully utilizing the available industrial capacity for high demand weapons that are essential for the high-end fight. The FY 2020 request includes procurement for the Joint Air-to-Surface Missile (JASSM), Long Range Anti-Ship Missile (LRASM), Standard Missile (SM)-6, Joint Direct Attack Munition (JDAM), Hellfire, and Small Diameter Bomb (SDB) I, SDB II, and Guided Multiple Launch Rocket System (GMLRS). They have been funded at the maximum production rate, which includes foreign military sales, to ensure that the inventory of these weapons are available to overmatch adversary forces. Also included in this category is the modernization of the nuclear enterprise, by investing in a new generation of delivery platforms and procurement of nuclear weapon delivery systems, such as the existing Trident II, the Ground Based Strategic Deterrent (GBSD), the B61 Tail Kit, and the Long Range Standoff (LRSO) weapon programs. For display purposes, the Missiles and Munitions category includes the following subgroups:

- Conventional Ammunition
- Strategic Missiles
- Tactical Missiles

Shipbuilding and Maritime Systems

\$34.7 billion – 14 percent of the Investment budget request

Includes RDT&E and Procurement funding for shipbuilding and maritime systems. The FY 2020 budget request provides for the construction of 14 battle force ships which includes two unmanned surface vehicles. The FY 2020 request includes incremental funding for two FORD class nuclear aircraft carriers: U.S.S. ENTERPRISE (CVN-80) [an FY 2018 ship] and CVN-81. Construction of CVN-81 is accelerated from a future year to take advantage of shipyard efficiencies. The budget request also includes: four surface combatants (3 DDG-51 Flight III, 1 Frigate); three fast attack Virginia class submarines, two of which are Block V ships equipped with the Virginia Payload Module (VPM); the refueling and overhaul of the U.S.S. STENNIS (CVN-74); two fleet replenishment oilers; two rescue ships, and two unmanned surface vehicles. Also in this category are the development and construction of the first U.S.S. COLUMBIA class ballistic-missile submarine (SSBN) and funding for various requirements such as surface and shallow water mine countermeasures; surface training equipment; shipboard air traffic control systems, and diving and salvage equipment. For display purposes, Shipbuilding and Maritime Systems is further categorized by the following subgroups:

- Surface Combatant
- Submarine Combatant
- Support Ships
- Support
- Outfitting & Post Delivery
- Technology Development

Space Based Systems

\$11.9 billion – 5 percent of the Investment budget request

This category funds development and procurement of space based spacecraft, launch vehicles, space command and control systems, and terrestrial satellite terminals and equipment. The FY 2020 request includes the development of a new generation of secure communication and tactical warning and attack assessment satellite constellations. Also included in this category are space situation awareness requirements, the space test program, classified programs, and excludes \$124.7 million for Science and Technology (S&T) Major Force Program-12. For display purposes, Space Based Systems is further categorized by the following subgroups:

- Launch
- Satellites
- Support

Science and Technology

\$14.1 billion – 6 percent of the Investment budget request

Given today's globalized access to knowledge and the rapid pace of technology development, innovation and agility have taken on a greater importance. The funding in this category fosters innovation and develops advanced state-of-the art technology to protect the United States, its allies, and American forces worldwide. Key S&T efforts include Artificial Intelligence (AI), Hypersonics (offensive and defensive), Directed Energy (DE), and Quantum sciences. Transitioning these technologies to operational systems will bring critical new capabilities to the battlefield. For display purposes, RDT&E S&T, is further categorized by the following subgroups:

- Basic Research
- Applied Research
- Advanced Technology Development

Mission Support Activities

\$70.8 billion – 29 percent of the Investment budget request

This category includes RDT&E and Procurement funding for various miscellaneous equipment used by combat and non-combat forces, cross departmental capabilities such as live fire test and evaluation (such as testing ranges), chemical demilitarization, Defense Production Act (DPA) purchases; funding for Joint Urgent Operational Needs; and funding for the Joint Improvised-Threat Defeat Organization (JIDO). Also included in this category are classified program and capabilities not reflected in the other categories identified previously.

Program Acquisition Cost By Weapon System Funding Tables Display Criteria of Weapon System Funding

The funding amount represents the direct program costs for the development and the acquisition of the Programs, Projects and Activities (PPA). Not included are the costs associated with initial and replenishment spare parts.

FY 2018 amounts reflect the actual amount as of September 30, 2018, does not include congressional rescissions, and combines both Base and Overseas Contingency Operations (OCO) funding.

FY 2019 amounts reflect congressionally enacted amount as of September 30, 2018, and combines both Base and OCO funding.

FY 2020 amounts reflect the funding requested by the Department of Defense in both Base and OCO appropriations.

Major Weapon Systems Summary

FY 2020

(\$ in Millions)		FY 2018	FY 2019	FY 2020			Page
				Base Budget	OCO Budget	Total Request	
Aircraft and Related Systems – Joint Service							
F-35	Joint Strike Fighter	12,724.9	11,579.7	11,211.4	-	11,211.4	1-2
V-22	Osprey	1,559.8	1,430.4	1,307.5	-	1,307.5	1-3
C-130J	Hercules	3,276.8	2,594.2	1,623.9	-	1,623.9	1-4
MQ-1B / MQ-1C	Predator/Gray Eagle	430.9	316.8	36.3	88.1	124.4	1-5
MQ-9	Reaper	907.1	741.0	753.9	270.9	1,024.8	1-6
MQ-4C / RQ-4	Triton/Global Hawk/NATO AGS	1,314.5	1,322.1	1,008.7	-	1,008.7	1-7
Aircraft and Related Systems – US Army (USA)							
AH-64E	Apache: Remanufacture/New Build	1,984.2	1,463.1	1,003.2	-	1,003.2	1-8
CH-47	Chinook	612.2	284.8	332.9	25.0	357.9	1-9
UH-60	Black Hawk	1,293.0	1,448.3	1,673.4	-	1,673.4	1-10
Aircraft and Related Systems – US Navy (USN) / US Marine Corps (USMC)							
MQ-25	Stingray	194.2	518.9	671.3	-	671.3	1-11
F/A-18	Super Hornet	1,951.4	2,088.6	2,024.0	-	2,024.0	1-12
E-2D	Advanced Hawkeye	1,177.7	1,619.1	1,291.4	-	1,291.4	1-13
P-8A	Poseidon	2,100.3	2,244.6	1,513.0	-	1,513.0	1-14
VH-92A	Presidential Helicopter	430.6	894.1	845.5	-	845.5	1-15
CH-53K	Heavy Lift Replacement Helicopter	1,279.1	1,505.6	1,539.9	-	1,539.9	1-16
H-1	AH-1Z Viper/ UH-1Y Venom	931.8	852.7	127.4	-	127.4	1-17
Aircraft and Related Systems – US Air Force (USAF)							
B-21	Raider	1,914.6	2,279.2	3,003.9	-	3,003.9	1-18
B-1, B-2, B-52	Bombers	760.5	1,012.0	868.3	-	868.3	1-19
KC-46A	Tanker	3,003.9	2,379.6	2,304.3	-	2,304.3	1-20
PAR	Presidential Aircraft Recapitalization	418.5	657.9	757.9	-	757.9	1-21
F-22	Raptor	866.4	909.9	819.9	-	819.9	1-22
F-15	Eagle	963.2	1,004.3	2,066.1	-	2,066.1	1-23
CRH	Combat Rescue Helicopter	342.0	1,106.1	1,131.3	-	1,131.3	1-24
T-X Program	Advanced Pilot Training Program	82.6	245.5	348.5	-	348.5	1-25
C4I Systems – USA							
WIN-T	Warfighter Information Network – Tactical	517.0	631.1	434.1	40.0	474.1	2-2
C4I Systems – Joint Service							
HMS	Handheld, Manpack, and Small Form Fit Radios	424.2	302.3	503.7	-	503.7	2-3
Cyberspace	Cyberspace	2,533.1	2,593.3	2,844.5	-	2,844.5	2-4
Ground Systems – Joint Service							
JLTV	Joint Light Tactical Vehicle	1,162.4	1,928.3	1,600.6	41.0	1,641.6	3-2
Ground Systems – USA							
M-1	Abrams Tank Modification/Upgrades	1,784.0	2,652.0	2,221.2	13.1	2,234.3	3-3
AMPV	Armored Multi-Purpose Vehicle	742.6	784.5	360.7	221.6	582.3	3-4
PIM	Paladin Integrated Management	778.0	525.9	553.4	-	553.4	3-5
FMTV	Family of Medium Tactical Vehicles	278.7	172.8	108.8	-	108.8	3-6
FHTV	Family of Heavy Tactical Vehicles	120.3	172.8	26.7	26.9	53.6	3-7
GMV	Ground Mobility Vehicle	44.6	44.0	40.0	-	40.0	3-8
Stryker	Stryker	981.3	442.9	750.8	4.1	754.9	3-9
Ground Systems – USMC							
ACV	Amphibious Combat Vehicle	307.1	233.6	395.3	-	395.3	3-10
Missile Defeat and Defense Programs – Joint Service							
GMD	Ground-based Midcourse Defense	2,255.4	1,836.9	1,676.5	-	1,676.5	4-2
THAAD	Terminal High Altitude Area Defense	1,615.5	1,463.4	753.8	-	753.8	4-3
Aegis	Aegis Ballistic Missile Defense	2,168.0	1,630.9	1,720.1	-	1,720.1	4-4
Missile Defeat and Defense Programs – USA							
Patriot / PAC-3	Patriot Advanced Capability	671.4	487.8	524.2	279.5	803.7	4-5
PAC-3 / MSE	PAC-3/Missile Segment Enhancement Missile	1,103.0	1,131.3	-	736.5	736.5	4-6
Missiles and Munitions – Joint Service							
JDAM	Joint Direct Attack Munition	1,149.3	1,119.3	-	1,148.9	1,148.9	5-2
Hellfire	Hellfire Missiles	821.2	484.0	118.9	611.9	730.8	5-3
SDB I	Small Diameter Bomb I	301.4	209.3	275.4	-	275.4	5-4
SDB II	Small Diameter Bomb II	240.9	367.3	293.7	118.5	412.2	5-5
JASSM	Joint Air-to-Surface Standoff Missile	462.5	645.3	561.0	20.9	581.9	5-6
AIM-9X	Air Intercept Missile - 9X	272.0	320.1	190.2	119.5	309.7	5-7
AMRAAM	Advanced Medium Range Air-to-Air Missile	530.5	581.5	426.7	224.5	651.2	5-8
Chem-Demil	Chemical Demilitarization	961.7	993.8	985.5	-	985.5	5-9
JAGM	Joint Air-to-Ground Missile	225.2	309.0	42.9	324.4	367.3	5-10
LRASM	Long Range Anti-Ship Missile	333.2	304.9	65.4	143.2	208.6	5-11

Major Weapon Systems Summary

FY 2020

(\$ in Millions)		FY 2018	FY 2019	FY 2020			Page
				Base Budget	OCO Budget	Total Request	
Missiles and Munitions – USA							
GMLRS	Guided Multiple Launch Rocket System	1,180.9	1,124.0	167.7	1,245.7	1,413.4	5-12
Javelin	Javelin Advanced Anti-Tank Weapon	323.3	254.1	38.1	142.8	180.9	5-13
Missiles and Munitions – USN							
Trident II	Trident II Ballistic Missile Modification	1,270.0	1,119.0	23.3	1,177.3	1,200.6	5-14
Standard	Standard Missile-6	581.8	696.7	149.9	500.6	650.5	5-15
RAM	Rolling Airframe Missile	146.2	122.5	22.0	106.8	128.8	5-16
Tomahawk	Tactical Tomahawk Cruise Missile	403.0	351.0	706.9	-	706.9	5-17
Missiles and Munitions – USAF							
GBSD	Ground Based Strategic Deterrent	221.5	414.4	570.4	-	570.4	5-18
B61	B61 Tail Kit Assembly	156.5	233.8	27.6	80.8	108.4	5-19
LRSO	Long Range Stand-Off Missile	437.5	664.9	712.5	-	712.5	5-20
Shipbuilding and Maritime Systems – USN							
CVN 78	<i>Gerald R. Ford</i> Class Nuclear Aircraft Carrier	4,355.0	1,748.3	2,606.7	-	2,606.7	6-2
SSBN 826	<i>Columbia</i> Class Submarine	1,902.9	3,906.3	2,232.0	-	2,232.0	6-3
SSN 774	<i>Virginia</i> Class Submarine	5,745.0	7,428.1	10,218.3	-	10,218.3	6-4
DDG 51	<i>Arleigh Burke</i> Class Destroyer	3,814.8	6,224.6	5,753.8	-	5,753.8	6-5
FFG(X)	Guided Missile Frigate	137.7	-	1,340.2	-	1,340.2	6-6
CVN	Refueling Complex Overhaul	1,645.6	425.9	647.9	-	647.9	6-7
T-AO 205	<i>John Lewis</i> Class Fleet Replenishment Oiler	535.0	1,086.6	1,081.3	-	1,081.3	6-8
T-ATS	Towing, Salvage, and Rescue Ship	76.2	80.5	150.3	-	150.3	6-9
USV	Unmanned Surface Vehicle	-	44.8	446.8	-	446.8	6-10
Space Based Systems – USAF							
NSSL	National Security Space Launch	1,774.7	2,057.6	1,669.6	-	1,669.6	7-2
GPS III	Global Positioning System III and Projects	1,154.8	1,424.9	1,757.2	-	1,757.2	7-3
OPIR	Space Based Overhead Persistent Infrared System	1,488.1	812.1	1,629.2	-	1,629.2	7-4
SATCOM	Satellite Communications Projects	1,074.4	830.7	1,112.7	-	1,112.7	7-5

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Aircraft and Related Systems

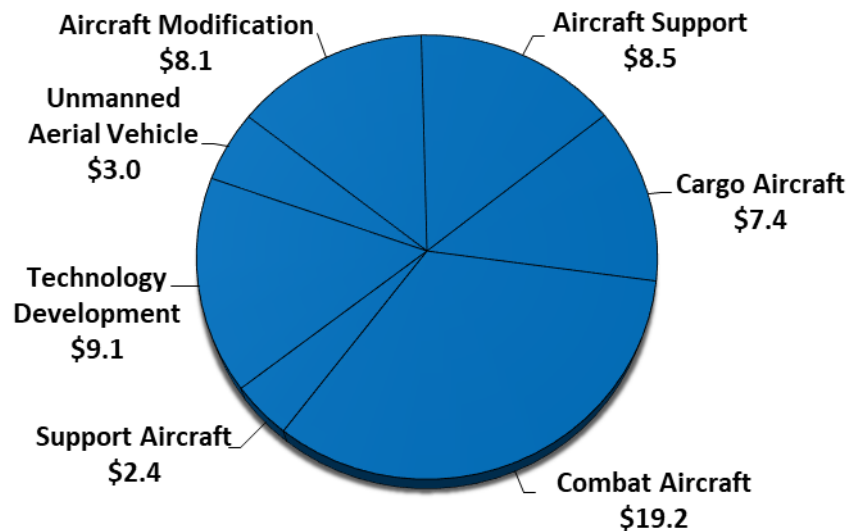
Aviation forces - including fighter/attack, bomber, mobility (cargo/tanker), specialized support aircraft, and unmanned aircraft systems — provide a versatile strike force capable of rapid deployment worldwide. These forces can quickly gain and sustain air dominance over regional aggressors, permitting rapid attacks on enemy targets while providing security to exploit the air for logistics, command and control, intelligence, and other functions. Fighter/attack aircraft operate from both land bases and aircraft carriers to provide air superiority to combat enemy fighters and attack ground and ship targets. Bombers provide an intercontinental capability to rapidly strike surface targets. The specialized aircraft supporting conventional operations perform functions such as intelligence, surveillance, and reconnaissance; airborne warning and control; air battle management; suppression of enemy air defenses; and combat search and rescue. In addition to these forces, the U.S. military operates a variety of air mobility forces including cargo, aerial-refueling aircraft, helicopters, and support aircraft.

Reflected in the FY 2020 request, is a revised Tactical Air (TACAIR) strategy to supplement 5th generation fighters like the F-22 and F-35 with 4th generation capability, to more economically address threats that do not require state-of-the-art 5th generation combat jets.

The FY 2020 Base and OCO funding provides for the procurement of 78 F-35A/B/C, 24 F/A-18E/F, 8 F-15EX, 50 logistics and support aircraft, 188 rotary wing aircraft, and 41 Unmanned Aerial Vehicles (UAV). In addition, the funding in this category provides for the development of aircraft related technology, the procurement of aerospace equipment and systems, various modifications to existing aircraft, and the procurement of initial spares.

FY 2020 Aircraft and Related Systems Total: \$57.7 Billion

\$ in Billions



Numbers may not add due to rounding

F-35 Joint Strike Fighter

DOD - JOINT

The F-35 Joint Strike Fighter (JSF) is a fifth-generation strike fighter for the Navy, Marine Corps, Air Force, and U.S. Allies. The F-35 consists of three variants: the F-35A Conventional Take-Off and Landing (CTOL), the F-35B Short Take-Off and Vertical Landing (STOVL), and the F-35C Carrier variant (CV). The F-35A CTOL replaces the Air Force F-16 and A-10 aircraft and complements the F-22 aircraft; the F-35B STOVL aircraft replaces the Marine Corps AV-8B aircraft and F/A-18A/C/D aircraft; the F-35C CV aircraft complements the F/A-18E/F aircraft for the Navy, and will also be flown by the Marine Corps. The F-35 program is a joint, multi-national program among the United States and eight cooperative international partners, as well as three Foreign Military Sales (FMS) countries. The Marine Corps and the Air Force declared Initial Operational Capability (IOC) in July 2015 and August 2016, respectively. The Navy's IOC date for the F-35C is scheduled for Spring 2019.



Mission: Provides all-weather, precision, stealthy, air-to-air, and ground strike capability, including direct attack on the most lethal surface-to-air missiles and air defenses.

FY 2020 Program: Continues systems engineering, development and operational testing, and supports Continuous Capability Development and Delivery (C2D2) to provide incremental warfighting capability improvements to maintain joint air dominance against evolving threats. Procures 78 aircraft in FY 2020: 48 CTOL for the Air Force, 10 STOVL for the Marine Corps, and 20 CV for the Navy. Accelerates an organic depot maintenance capability to reduce depot repair cycle times to improve air vehicle availability rates.

Prime Contractor(s): Lockheed Martin Corporation; Fort Worth, TX (airframe)
Pratt & Whitney; Hartford, CT (engine)

F-35 Joint Strike Fighter										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E										
USN	540.5	-	594.2	-	809.8	-	-	-	809.8	-
USAF	607.3	-	572.9	-	802.0	-	-	-	802.0	-
Subtotal	1,147.8	-	1,167.1	-	1,611.8	-	-	-	1,611.8	-
Procurement										
USN	4,982.2	34	4,850.5	37	4,245.2	30	-	-	4,245.2	30
USAF	6,505.0	56	5,267.0	56	4,929.9	48	-	-	4,929.9	48
Subtotal	11,487.2	90	10,117.5	93	9,175.1	78	-	-	9,175.1	78
Mods	89.9	-	295.1	-	424.5	-	-	-	424.5	-
Total	12,724.9	90	11,579.7	93	11,211.4	78	-	-	11,211.4	78

Note: Includes Modification Program

Numbers may not add due to rounding

V-22 Osprey

DOD - JOINT

The V-22 Osprey is a tilt-rotor, vertical takeoff and landing aircraft designed to meet the amphibious/vertical assault needs of the Marine Corps, the strike rescue and Carrier Onboard Delivery (COD) needs of the Navy, and the long range special operations forces (SOF) missions for U.S. Special Operations Command (SOCOM). The aircraft is designed to fly 2,100 miles with one in-flight refueling, giving the Services the advantage of a vertical and/or short takeoff and landing aircraft that can rapidly self-deploy to any location in the world.



Mission: Conducts airborne assault, vertical lift, combat search and rescue, and special operations missions. The new CMV-22 variant will replace the Navy’s C-2A Greyhound for the COD mission.

FY 2020 Program: Funds the third year of a follow-on multiyear procurement (MYP) contract (FY 2018 to 2024), procuring ten CMV-22 aircraft for the Navy.

Prime Contractor(s): Bell Helicopter Textron, Incorporated; Fort Worth, TX
The Boeing Company; Philadelphia, PA

V-22 Osprey										
	FY 2018		FY 2019		FY 2020					
	FY 2018 \$M	Qty	FY 2019 \$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E										
USN	162.3	-	135.5	-	185.1	-	-	-	185.1	-
USAF	30.0	-	38.8	-	46.0	-	-	-	46.0	-
Subtotal	192.4	-	174.3	-	231.1	-	-	-	231.1	-
Procurement										
USN	1,264.3	14	1,163.1	13	993.8	10	-	-	993.8	10
USAF	103.2	-	92.9	-	82.6	-	-	-	82.6	-
Subtotal	1,367.4	14	1,256.0	13	1,076.4	10	-	-	1,076.4	10
USN Subtotal	1,426.6	14	1,298.6	13	1,178.9	10	-	-	1,178.9	10
USAF Subtotal	133.2	-	131.8	-	128.6	-	-	-	128.6	-
Total	1,559.8	14	1,430.4	13	1,307.5	10	-	-	1,307.5	10

Note: Includes Modification Program

Numbers may not add due to rounding

C-130J Hercules

DOD - JOINT

The C-130J Hercules is a medium-sized tactical transport airlift aircraft that is modernizing the U.S. tactical airlift capability. It is capable of performing a variety of combat delivery (tactical airlift) operations across a broad range of mission environments including deployment and redeployment of troops and/or supplies within/between command areas in a theater of operation, aeromedical evacuation, air logistics support, and augmentation of strategic airlift forces. The C-130J aircraft, with its extended fuselage, provides additional cargo carrying capacity for the Air Force combat delivery mission compared to the legacy C-130E/H and the C-130J (short) aircraft. Special mission variants of the C-130J conduct airborne Military Information Support operations (EC-130J), weather reconnaissance (WC-130J), search and rescue (HC-130J), and special operations (MC-130J and AC-130J). The KC-130J provides the Marine Corps with air-to-air refueling/tactical transport capability; airborne radio relay; intelligence, surveillance, and reconnaissance; and close air support to replace the KC-130 F/R/T aircraft.



USAF Photo

Mission: Provides responsive air movement and delivery of combat troops/supplies directly into objective areas through air landing, extraction, and airdrop, and the air logistic support of theater forces.

FY 2020 Program: Continues the multiyear procurement (MYP) C-130J contract (FY 2019 to FY 2023).

Prime Contractor(s): Lockheed Martin Corporation; Marietta, GA

C-130J Hercules										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E										
HC/MC-130J	30.8	-	16.2	-	17.2	-	-	-	17.2	-
C-130J	24.9	-	15.4	-	8.6	-	-	-	8.6	-
Subtotal	55.7	-	31.6	-	25.8	-	-	-	25.8	-
Procurement										
C-130J	639.7	6	675.8	8	12.2	-	-	-	12.2	-
HC-130J	281.5	3	183.8	2	-	-	-	-	-	-
MC-130	1,009.4	11	945.9	6	911.2	8	-	-	911.2	8
KC-130J	497.8	6	252.4	2	306.9	3	-	-	306.9	3
Subtotal	2,428.4	26	2,057.9	18	1,230.2	11	-	-	1,230.2	11
Mods	792.7	-	504.7	-	367.9	-	-	-	367.9	-
Total	3,276.8	26	2,594.2	18	1,623.9	11	-	-	1,623.9	11

Note: Includes Modification Program

Numbers may not add due to rounding

MQ-1B Predator / MQ-1C Gray Eagle

DOD - JOINT

The U.S. Air Force (USAF) MQ-1B Predator and the Army MQ-1C Gray Eagle Unmanned Aircraft Systems (UAS) are comprised of aircraft configured with multi-spectral targeting systems (electro-optical, infra-red (IR), laser designator, and IR illuminator) providing real-time full motion video, weapons, data links, and ground control stations with communications equipment providing line-of-sight and beyond-line-of-sight control. Both systems include single-engine, propeller-driven unmanned aircraft. The Air Force is in the process of divesting the MQ-1 and replacing all aircraft with MQ-9 Reapers. The MQ-1C Gray Eagle includes the Gray Eagle Extended Range Engineering Change Proposal, which extends the range and endurance of the aircraft.



US Army Photo

Mission: Operates over-the-horizon at medium altitude for long endurance and provides real-time intelligence, surveillance, reconnaissance (ISR), target acquisition, and strike capability to aggressively prosecute time-sensitive targets. The Army MQ-1C Gray Eagle also adds a Synthetic Aperture Radar (SAR) Ground Moving Target Indicator (GMTI), a communications relay capability, a heavy fuel engine, encrypted tactical common data link, and greater weapons capability.

FY 2020 Program: Continues development of advanced MQ-1 Payload sensors and investments in propulsion reliability. Procures six Gray Eagle Extended Range War Replacement Aircraft in Overseas Contingency Operations (OCO) funding. Procurement investment in improved navigation and datalink modernization.

Prime Contractor(s): General Atomics–Aeronautical Systems Incorporated; San Diego, CA

MQ-1B Predator / MQ-1C Gray Eagle										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E										
Gray Eagle USA	61.7	-	23.7	-	21.6	-	34.1	-	55.7	-
Procurement										
Gray Eagle USA	369.2	20	293.1	10	14.7	-	54.0	6	68.7	6
Total	430.9	20	316.8	10	36.3	-	88.1	6	124.4	6

Note: Includes Modification Program

Numbers may not add due to rounding

MQ-9 Reaper



The U.S. Air Force MQ-9 Reaper Unmanned Aircraft System (UAS) program is comprised of an aircraft segment consisting of aircraft configured with an array of sensors to include day/night Full Motion Video (FMV), Signals Intelligence (SIGINT), and Synthetic Aperture Radar (SAR) sensor payloads, avionics, data links and weapons; a Ground control segment consisting of a Launch and Recovery Element, and a Mission Control Element with embedded Line-of-Sight and Beyond-Line-of-Sight communications equipment. The Reaper is a single-engine, turbo-prop, remotely piloted armed reconnaissance aircraft designed to operate over-the-horizon at medium altitude for long endurance. Funding for U.S. Special Operations Command (USSOCOM) procures Special Operations Force (SOF)-unique kits, payloads and modifications.



USAF Photo

Mission: Provides reconnaissance and embedded strike capability against time-critical targets.

FY 2020 Program: Funds the continued development, transformation, and fielding of Reaper aircraft and ground stations. The base request includes the procurement of three MQ-9 aircraft, twelve Ground Control Stations, and continues the modification of MQ-9s to the extended range configuration. The OCO request includes the procurement of nine additional MQ-9 aircraft for the USAF and three MQ-9 aircraft for the USMC.

Prime Contractor(s): General Atomics–Aeronautical Systems Incorporated; San Diego, CA

MQ-9 Reaper										
	FY 2018		FY 2019		FY 2020					
					Base Budget		OCO Budget		Total Request	
	\$M	Qty	\$M	Qty	\$M	Qty	\$M	Qty	\$M	Qty
RDT&E										
USAF	184.4	-	108.8	-	155.0	-	-	-	155.0	-
SOCOM	33.1	-	18.4	-	20.7	-	-	-	20.7	-
Subtotal	217.5	-	127.2	-	175.7	-	-	-	175.7	-
Procurement									-	-
USAF	648.2	16	589.2	24	572.8	3	192.0	9	764.8	12
USN	-	-	-	-	-	-	77.0	3	77.0	3
SOCOM	41.4	-	24.6	-	5.4	-	1.9	-	7.3	-
Subtotal	689.6	16	613.8	24	578.2	3	270.9	12	849.1	15
Total	907.1	16	741.0	24	753.9	3	270.9	12	1,024.8	15

Note: Includes Modification Program

Numbers may not add due to rounding

MQ-4C Triton/RQ-4 Global Hawk/NATO AGS



The Navy MQ-4C Triton, U.S. Air Force (USAF) RQ-4 Global Hawk, and NATO Alliance Ground Surveillance (AGS) Unmanned Aircraft System programs provide high altitude long endurance Intelligence, Surveillance, and Reconnaissance (ISR) capabilities. The MQ-4C will provide the Navy with a persistent maritime ISR capability.



US Navy Photo

Mission systems include inverse SAR, Electro-optical/Infra-red Full Motion Video (FMV), maritime moving target detection, Electronic Support Measures (ESM), Automatic Identification System (AIS), a basic communications relay capability, and Link-16. The RQ-4 Block 30 includes a multi-intelligence suite for imagery and signals intelligence collection, and the Block 40 includes multi-platform radar technology for synthetic aperture radar (SAR) imaging and moving target detection. All RQ-4 aircraft have been delivered. Five NATO AGS aircraft are being procured with development funding. Deliveries will complete in FY 2018.

Mission: The Navy MQ-4C provides persistent maritime ISR, while the USAF and NATO AGS RQ-4 systems perform high-altitude, near-real-time, high-resolution ISR collection. Both systems support Combatant Commander requirements, while the MQ-4C also supports the numbered Fleet commanders from five worldwide sites.

FY 2020 Program: MQ-4C: Funds the procurement of two systems, and continues to fund development activities associated with software upgrades and the multi-intelligence effort. RQ-4: Funds the development of modernization efforts including the MS-177 multi-spectral sensor, ground segment modernization program, communications system modernization program and additional program efforts; and the U.S. contribution to the NATO AGS.

Prime Contractor(s): Northrop Grumman; Rancho Bernardo, CA

MQ-4C Triton / RQ-4 Global Hawk / NATO AGS										
	FY 2018		FY 2019		FY 2020					
	FY 2018 \$M	Qty	FY 2019 \$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E										
RQ-4, USAF	222.7	-	221.7	-	191.7	-	-	-	191.7	-
RQ-4, NATO	44.7	-	51.5	-	32.6	-	-	-	32.6	-
MQ-4, USN	318.3	-	233.8	-	214.1	-	-	-	214.1	-
Subtotal	585.7	-	507.0	-	438.4	-	-	-	438.4	-
Procurement										
RQ-4, USAF	162.7	-	164.3	-	49.0	-	-	-	49.0	-
MQ-4, USN	566.1	3	650.8	3	521.3	2	-	-	521.3	2
Subtotal	728.8	3	815.1	3	570.2	2	-	-	570.2	2
Total	1,314.5	3	1,322.1	3	1,008.7	2	-	-	1,008.7	2

Note: Includes Modification Program

Numbers may not add due to rounding

AH-64E Apache

USA

The AH-64E Apache program is a parallel new build and remanufacture effort, which integrates a mast-mounted fire control radar into an upgraded and enhanced AH-64 airframe. The remanufacture effort results in a zero-time Longbow Apache, which restarts its service life and upgrades the aircraft with updated technologies and performance enhancements to keep the Apache viable throughout its lifecycle.



US Army Photo

The AH-64E program incorporates a new power train system that restores the aircraft to its previous flight performance capabilities that have been reduced over years of added weight. The AH-64E has all new open architecture computer systems including an all-digital cockpit flight control. The aircraft also has manned/unmanned teaming capability with the Army's Unmanned Aerial Systems giving the system far greater targeting distances. Additionally, the AH-64E has the ability to share targeting data with Joint forces via its onboard Link 16 system.

Mission: Conducts armed reconnaissance, close combat, mobile strike, and vertical maneuver missions in day, night, obscured battlefield, and adverse weather conditions.

FY 2020 Program: Funds the remanufacture of 48 AH-64D aircraft to the AH-64E configuration in the fourth year of a 5-year multiyear procurement (MYP) contract (FY 2017 – FY 2021) and continued development of upgrades to enhance operational capabilities.

Prime Contractor(s): Apache: The Boeing Company; Mesa, AZ
 Integration: Northrop Grumman Corporation; Baltimore, MD
 Lockheed Martin Corporation; Oswego, NY

AH-64E Apache										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	55.6	-	24.0	-	5.4	-	-	-	5.4	-
Procurement										
AH-64E New Build	1,023.3	31	511.3	18	-	-	-	-	-	-
AH-64E Reman	905.3	48	927.8	48	997.7	48			997.7	48
Total	1,984.2	79	1,463.1	66	1,003.2	48	-	-	1,003.2	48

Numbers may not add due to rounding

CH-47 Chinook

USA

The CH-47F Improved Cargo Helicopter program procures new and remanufactured Service Life Extension Program (SLEP) CH-47F helicopters. The aircraft includes an upgraded digital cockpit and modifications to the airframe to reduce vibration. The upgraded cockpit includes a digital data bus that permits installation of enhanced communications and navigation equipment for improved situational awareness, mission performance, and survivability. The new aircraft uses more powerful T55-GA-714A engines that improve fuel efficiency and enhance lift performance. These aircraft are fielded to heavy helicopter companies (CH-47F) and Special Operations Aviation (MH-47G). The CH-47F is expected to remain the Army's heavy lift helicopter until the late 2030s. Recapitalization of the MH-47G airframes is required to extend the useful life of legacy aircraft. The CH-47F Block II development effort is in Engineering and Manufacturing Development. Improvements include increased lift, improved engine control, upgraded drive train components and advanced flight controls. New Build CH-47Fs will continue at a low rate until production of the CH-47F Block II in FY 2021.



US Army Photo

Mission: Transports ground forces, supplies, ammunition, and other battle-critical cargo in support of worldwide combat and contingency operations.

FY 2020 Program: Funds the procurement of eight ReNew/SLEP MH-47G helicopters in Base and replaces one combat loss MH-47G in OCO.

Prime Contractor(s): The Boeing Company; Philadelphia, PA

CH-47 Chinook										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	155.4	-	144.7	-	174.4	-	-	-	174.4	-
Procurement	456.8	14	140.1	7	158.5	8	25.0	1	183.5	9
Total	612.2	14	284.8	7	332.9	8	25.0	1	357.9	9

Numbers may not add due to rounding

UH-60 Black Hawk

USA

The UH-60 Black Hawk is a twin engine, single-rotor, four bladed utility Helicopter that is designed to carry a crew of 4 and a combat equipped squad of 11 or an external load up to 9,000 lbs. The UH-60 comes in many variants and with many different modifications. Variants may have different capabilities and equipment in order to fulfill different roles. The Army variants can be fitted with stub wings to carry additional fuel tanks or weapons. The UH-60M Black Hawk is a digital networked platform with greater range and lift to support operational Commanders through air assault, general support command and control, and aeromedical evacuation. A HH-60M is a UH-60M Black Hawk integrated with the Medical Evacuation (MEDEVAC) Mission Equipment Package (MEP) kit, which provides day/night and adverse weather emergency evacuation of casualties. FY 2018 was the first year of production upgrades for the UH-60L to UH-60V. This conversion provides an integrated digital map, integrated performance planning, common functionality and commonality of training with the UH-60M.



US Army Photo

Mission: Provides a highly maneuverable, air transportable, troop carrying helicopter for all intensities of conflict, without regard to geographical location or environmental conditions. It moves troops, equipment, and supplies into combat and performs aeromedical evacuation and multiple functions in support of the Army's air mobility doctrine for employment of ground forces.

FY 2020 Program: Funds procurement of 73 UH-60M aircraft, in the fourth year of a follow-on 5-year multiyear procurement (MYP) contract (FY 2017- FY 2021). Also funds procurement of 25 cockpit kit upgrades of UH-60L helicopters to UH-60V.

Prime Contractor(s): Sikorsky, A Lockheed Martin Company; Stratford, CT (UH-60M), Redstone Defense Systems, Huntsville, AL (UH-60V)

UH-60 Black Hawk										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	48.2	-	35.2	-	13.0	-	-	-	13.0	-
Procurement										
UH-60M	1,168.3	57	1,265.0	58	1,491.1	73	-	-	1,491.1	73
UH-60V	76.5	35	148.1	18	169.3	25	-	-	169.3	25
Total	1,293.0	92	1,448.3	76	1,673.4	98	-	-	1,673.4	98

Numbers may not add due to rounding

MQ-25 Stingray



The U.S. Navy MQ-25 Stingray Unmanned Carrier Aviation (UCA) program is rapidly developing an unmanned capability to embark as part of the Carrier Air Wing (CVW) to conduct aerial refueling and provide Intelligence, Surveillance, and Reconnaissance (ISR) capability. The MQ-25 will extend CVW mission effectiveness range and partially mitigate the current Carrier Strike Group (CSG) organic ISR shortfall. As the first carrier-based Group 5 Unmanned Aircraft System (UAS), the MQ-25 will pioneer the integration of manned and unmanned operations, demonstrate complex sea-based UAS technologies and pave the way for future multi-mission UAS to pace emerging threats. The MQ-25 was previously funded under the Unmanned Carrier Launched Airborne Surveillance and Strike (UCLASS) program. The program entered into Engineering and Manufacturing Development (EMD) in the fourth quarter of FY 2018 and is expected to provide an Initial Operational Capability (IOC) to the fleet by FY 2024.



Mission: Conducts aerial refueling as a primary mission and provides ISR as a secondary mission.

FY 2020 Program: Funds production development, procures three System Demonstration Test Articles (SDTA) aircraft, conducts engineering analysis to support System Design Review, and initiate assembly of four Engineering Development Models (EDM) vehicles.

Prime Contractor(s): Boeing; St. Louis, MO

MQ-25 Stingray										
	FY 2018		FY 2019		FY 2020					
					Base Budget		OCO Budget		Total Request	
	\$M	Qty	\$M	Qty	\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	194.2	-	518.9	-	671.3	-	-	-	671.3	-
Procurement	-	-	-	-	-	-	-	-	-	-
Total	194.2	-	518.9	-	671.3	-	-	-	671.3	-

Numbers may not add due to rounding

F/A-18 E/F Super Hornet



The F/A-18 E/F Super Hornet is a carrier-based multi-role tactical fighter and attack aircraft. Two versions are in production: the single-seat E model and the two-seat F model. The Super Hornet is an attack aircraft as well as a fighter through selected use of external equipment and advanced networking capabilities to accomplish specific missions. This “force multiplier” capability gives the operational commander more flexibility in employing tactical aircraft in a rapidly changing battle scenario. In its fighter mode, the aircraft serves as escort and fleet air defense. In its attack mode, the aircraft provides force projection, interdiction, and close and deep air support.



US Navy Photo

Mission: Provides multi-role attack and strike fighter capability, which includes the traditional applications, such as fighter escort and fleet air defense, combined with the attack applications, such as interdiction and close air support.

FY 2020 Program: Procures 24 E/F model aircraft as part of multiyear procurement (MYP) contract (FY 2019 - FY 2021), spares and repair parts, and continued development of aircraft systems.

Prime Contractor(s): Airframe: Boeing; St. Louis, MO
 Engine: General Electric Company; Lynn, MA

F/A-18 E/F Super Hornet										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	68.2	-	108.7	-	113.5	-	-	-	113.5	-
Procurement	1,883.3	24	1,979.9	24	1,910.5	24	-	-	1,910.5	24
Total	1,951.4	24	2,088.6	24	2,024.0	24	-	-	2,024.0	24

Numbers may not add due to rounding

E-2D Advanced Hawkeye



The E-2D Advanced Hawkeye is an airborne early warning, all weather, twin-engine, carrier-based aircraft designed to extend task force defense perimeters. The Advanced Hawkeye provides improved battlespace target detection and situational awareness, especially in the littorals; supports the Theater Air and Missile Defense operations; and improves operational availability for the radar system. Relative to the E-2C aircraft, the E-2D aircraft provides increased electrical power, a strengthened fuselage, and upgraded radar system, communications suite, and mission computer.



Mission: Provides theater air and missile sensing and early warning; battlefield management command and control; acquisition tracking and targeting of surface warfare contacts; surveillance of littoral area objectives and targets; and tracking of strike warfare assets.

FY 2020 Program: Funds four E-2D aircraft as part of a multiyear procurement (MYP) contract (FY 2019 – FY 2023), associated support, continued development of systems, and advance procurement for additional aircraft in FY 2021.

Prime Contractor(s): Airframe: Northrop Grumman Corporation; Bethpage, NY
 (Engineering) and St. Augustine, FL (Manufacturing)
 Engine: Rolls-Royce Corporation; Indianapolis, IN
 Radar: Lockheed Martin Corporation; Syracuse, NY

E-2D Advanced Hawkeye										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	283.5	-	210.6	-	232.8	-	-	-	232.8	-
Procurement	894.2	5	1,408.6	6	1,058.7	4	-	-	1,058.7	4
Total	1,177.7	5	1,619.1	6	1,291.4	4	-	-	1,291.4	4

Numbers may not add due to rounding

P-8A Poseidon



The P-8A Poseidon is a multi-mission platform designed to replace the P-3C Orion propeller driven aircraft. This derivative of the Boeing 737 aircraft is an all-weather, twin engine, maritime patrol aircraft designed to sustain and improve armed maritime and littoral capabilities in traditional, joint, and combined roles to counter changing and emerging threats. All sensors onboard contribute to a single fused tactical situation display, which is shared over both military standard and internet protocol data links, allowing for seamless delivery of information between U.S. and allied forces. The P-8A will carry a new radar array, which is a modernized version of the Raytheon APS-149 Littoral Surveillance Radar System.



Mission: Provides Maritime Patrol Anti-Submarine Warfare (ASW), Anti-Surface Warfare (ASuW), and Intelligence, Surveillance and Reconnaissance (ISR) capabilities in maritime and littoral areas above, on, and below the surface of the ocean.

FY 2020 Program: Procures six P-8A aircraft, support equipment, spares and repair parts. Continues research and development on the aircraft systems that will be delivered and installed incrementally while full rate production continues for the baseline aircraft.

Prime Contractor(s): Airframe: Boeing; Seattle, WA
 Engine: CFM International; Cincinnati, OH

P-8A Poseidon										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	135.2	-	198.0	-	198.7	-	-	-	198.7	-
Procurement	1,965.1	10	2,046.6	10	1,314.3	6	-	-	1,314.3	6
Total	2,100.3	10	2,244.6	10	1,513.0	6	-	-	1,513.0	6

Numbers may not add due to rounding

VH-92A Presidential Helicopter



The VH-92A replaces the legacy Presidential Helicopter fleet – the VH-3D, which was fielded in 1974, and the VH-60N, which was fielded in 1989. The VH-92A will be based on Sikorsky’s commercial S-92A helicopter. The VH-92A’s acquisition strategy involves the integration of mature government-defined mission systems and an executive interior into an existing air vehicle. The program entered the Engineering and Manufacturing Development (EMD) phase in FY 2014. A total of 21 operational aircraft will be procured. Two EDM and four System Demonstration Test Article (SDTA) aircraft have been delivered in EMD.



Mission: Provide safe, reliable and timely transportation for the President, Vice President, Foreign Heads of State, and other official parties as directed by the Director of the White House Military Office. Mission tasking includes administrative lift and contingency operations.

FY 2020 Program: Funds the Low Rate Initial Production (LRIP) of six VH-92 helicopters. Funds the continuing EMD effort and preparation for Initial Operating Capability for fourth quarter of FY 2020.

Prime Contractor(s): Sikorsky Aircraft Corporation; Stratford, CT

VH-92A Presidential Helicopter										
	FY 2018		FY 2019		FY 2020					
					Base Budget		OCO Budget		Total Request	
	\$M	Qty	\$M	Qty	\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	430.6	-	245.1	-	187.4	-	-	-	187.4	-
Procurement	-	-	649.0	6	658.1	6	-	-	658.1	6
Total	430.6	-	894.1	6	845.5	6	-	-	845.5	6

Numbers may not add due to rounding

CH-53K Heavy Lift Replacement Helicopter



The CH-53K King Stallion is a marinized heavy-lift helicopter that replaces the U. S. Marine Corps CH-53E, which was introduced in 1980. The CH-53K will provide improved lift and range capabilities, performance, commonality, cargo-handling, reliability, maintainability, interoperability, ship integration,



survivability, and force protection. The CH-53K is designed to support Marine Air-Ground Task Force (MAGTF) heavy-lift requirements in the 21st century joint environment, and is the only heavy-lift platform that can lift the MAGTF ashore. It will provide an unparalleled high-altitude lift capability with nearly three times the external lift capacity of the CH-53E.

Mission: Conducts expeditionary heavy-lift assault transport of armored vehicles, equipment and personnel to support distributed operations deep inland from a sea-based center of operations.

FY 2020 Program: Funds the procurement of six Low-Rate Initial Production (LRIP) aircraft. FY 2020 CH-53K System Development and Demonstration activities include additional ground and flight test of one Ground Test Vehicle, four Engineering Development Models and four System Demonstration Test Articles (SDTAs), associated subsystems and components.

Prime Contractor(s): Sikorsky Aircraft Corporation; Stratford, CT

CH-53K Heavy Lift Replacement Helicopter										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	329.4		336.9	-	517.0	-	-	-	517.0	-
Procurement	949.7	6	1,168.7	8	1,022.9	6	-	-	1,022.9	6
Total	1,279.1	6	1,505.6	8	1,539.9	6	-	-	1,539.9	6

Numbers may not add due to rounding

H-1 Program: AH-1Z Viper/UH-1Y Venom



The H-1 program replaces the AH-1W Super Cobra and the UH-1N Huey helicopters with the AH-1Z Viper and UH-1Y Venom, the next generation of USMC Attack and Utility aircraft. Speed, range, and payload have been increased significantly, while supportability demands, training timelines, and total ownership cost have decreased. The advanced cockpit is common to both aircraft, reduces operator workload, improves situational awareness, and provides growth potential for future weapons and joint digital interoperability enhancements. The cockpit systems assimilate onboard planning, communications, digital fire control, all weather navigation, day/night targeting, and weapons systems in mirror-imaged crew stations. The procurement strategy converts 37 AH-1W helicopters into AH-1Zs (complete), builds 152 new AH-1Zs, remanufacture 10 H-1N helicopters into UH-1Ys (complete), and build 150 new UH-1Y models. The UH-1Y production completed in FY 2016 and AH-1Z is in full rate production with FY 2019 completing the program of record of 349 aircraft.



Mission: AH-1Z: Provides close air support, air interdiction, armed reconnaissance, strike coordination and reconnaissance, forward air control (airborne), and aerial escort during day/night operations in support of naval expeditionary operations or joint and combined operations. UH-1Y: Provides combat assault transport, close air support, armed reconnaissance, strike coordination and reconnaissance, forward air control (airborne), air delivery, airborne command and control, aerial escort and air evacuation during day/night and reduced weather conditions.

FY 2020 Program: Funds production line shutdown and AH-1Z aircraft production engineering support. Funds developmental efforts to support follow-on improvements to sensors and weapons integration, avionics, and air vehicle components that will address deficiencies, systems safety, obsolescence, and reliability issues for both the AH-1Z and UH-1Y helicopters.

Prime Contractor(s): Bell Helicopter Textron, Incorporated; Fort Worth, TX

H-1 Program: AH-1Z Viper / UH-1Y Venom										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	-	-	54.3	-	65.4	-	-	-	65.4	-
Procurement	931.8	29	798.4	25	62.0	-	-	-	62.0	-
Total	931.8	29	852.7	25	127.4	-	-	-	127.4	-

Numbers may not add due to rounding

B-21 Raider

The B-21 Raider, previously referred to as the Long Range Strike-Bomber (LRS-B), is a new, high-tech long range bomber that will eventually replace a portion of the Air Force’s bomber fleet. The B-21 will be a key component of the joint portfolio of conventional and nuclear capable deep-strike capabilities. The B-21 initial capability will be fielded in the mid-2020’s and the aircraft will be dual capable – conventional at Initial Operational Capability (IOC), with a projected nuclear capability within 2 years of IOC. Highly survivable, the B-21 Raider will have the ability to penetrate modern air defenses. The Air Force plans to procure a minimum of 100 aircraft. In November 2018, the program held the Critical Design Review (CDR). The CDR event served as a multi-disciplined technical review that ensured the Air Force’s newest bomber has a stable and mature design as the program moves forward into manufacturing and to flight test.



Mission: Flies into enemy territory to destroy strategic targets to debilitate an adversary’s capacity to wage war. The B-21 will maintain the capability to operate in contested environments, counter emerging threats, and support the nuclear triad by providing a visible and flexible nuclear deterrent capability. Additional details of the B-21 are currently classified.

FY 2020 Program: Continues Engineering and Manufacturing Development of the B-21.

Prime Contractor(s): Northrup Grumman Corporation; Falls Church, VA

B-21 Raider										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	1,914.6	-	2,279.2	-	3,003.9	-	-	-	3,003.9	-
Procurement	-	-	-	-	-	-	-	-	-	-
Total	1,914.6	-	2,279.2	-	3,003.9	-	-	-	3,003.9	-

Numbers may not add due to rounding

Bombers



Bombers provide an intercontinental capability to rapidly strike surface targets. The Air Force legacy bomber fleet includes the B-1, B-2, and B-52 aircraft. The B-1B Lancer is a swing-wing, supersonic, long-range conventional bomber and carries the largest payload of both guided and unguided weapons in the Air Force inventory. The multi-mission B-1B is the backbone of the U.S. long-range conventional bomber force and can rapidly deliver massive quantities of precision (and non-precision) weapons against any adversary, any place in the world, at any time. The B-2 Spirit is a multi-engine, long range bomber incorporating low-observable technology that enables the B-2 to penetrate enemy air defenses and strike high-value targets. The B-52 Stratofortress is a long range, subsonic, Jet-powered strategic bomber that maintains nuclear and conventional missions.



Mission: Flies into enemy territory to destroy strategic targets such as major military installations, factories and ports to debilitate an adversary’s capacity to wage war. The B-1B bomber can perform a variety of missions, including that of conventional carrier for theater operations and can rapidly deliver massive quantities of precision and non-precision weapons against any adversary, worldwide, at any time. The B-2 aircraft delivers both conventional and nuclear munitions, capable of massive firepower in short time anywhere, is the only aircraft capable of penetrating enemy defenses to bomb heavily defended targets and is the only aircraft to carry the 30,000 pound GBU-57 Massive Ordnance Penetrator. The B-52 aircraft maintains nuclear or conventional missions and carries the widest variety of weapons of all the bombers, including the only aircraft to carry the AGM-86 Air Launched Cruise Missile (ALCM) nuclear cruise missile or the conventional version of the AGM-86.

FY 2020 Program: Continues upgrades to modernize legacy bombers.

Prime Contractor(s): Northrop Grumman Aerospace Systems; Palmdale, CA (B-2)
Boeing Defense; Oklahoma City, OK (B-1, B-52)

Bombers										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	407.0	-	744.3	-	718.7	-	-	-	718.7	-
Procurement	353.5	-	267.7	-	149.6	-	-	-	149.6	-
Total	760.5	-	1,012.0	-	868.3	-	-	-	868.3	-

Note: Includes Modification Program

Numbers may not add due to rounding

KC-46A Tanker



The KC-46, an aerial refueling tanker, will provide aerial refueling support to the Air Force, Navy, and Marine Corps aircraft. The aircraft provides increased refueling capacity, improved efficiency, and increased cargo and aeromedical evacuation capability over the current KC-135 Stratotanker, which is more than 50 years old. The first phase of aerial refueling tanker recapitalization will procure 179 aircraft, approximately one-third of the current KC-135 tanker fleet. Envisioned KC-Y and KC-Z programs will ultimately recapitalize the entire tanker fleet over a period of more than 30 years. The KC-46 aircraft is assembled on the existing commercial 767 production line and militarized in the Everett Modification Center, both of which are located in Everett, Washington.



USAF Photo

The KC-46 aircraft is assembled on the existing commercial 767 production line and militarized in the Everett Modification Center, both of which are located in Everett, Washington.

Mission: Provides the capability to refuel joint and coalition receivers via a boom or drogue system and will augment the airlift fleet with cargo, passenger and aeromedical evacuation capabilities. Aerial refueling forces perform these missions at the strategic, operational, and tactical level across the entire spectrum of military operations. The KC-46 aircraft will operate in day/night and adverse weather to enable deployment, employment, sustainment, and redeployment of U.S. and Coalition forces.

FY 2020 Program: Begins Full Rate Production with 12 aircraft in FY 2020. Continues the Air Force’s development efforts of a militarized variant of the Boeing 767-2C aircraft, the building and integration of military capabilities into four development aircraft, and developmental and operational testing. Supports the development of technical manuals, continued Type I training, and collection of simulator and maintenance data.

Prime Contractor(s): The Boeing Company; Seattle, WA

KC-46A Tanker										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	75.6	-	80.2	-	59.6	-	-	-	59.6	-
Procurement	2,927.1	18	2,290.9	15	2,234.5	12	-	-	2,234.5	12
Mods	1.2	-	8.5	-	10.2	-	-	-	10.2	-
Total	3,003.9	18	2,379.6	15	2,304.3	12	-	-	2,304.3	12

Note: Includes Modification Program

Numbers may not add due to rounding

VC-25B Presidential Aircraft Recapitalization



The VC-25B Presidential Aircraft Recapitalization program will replace the current VC-25A (Boeing 747-200) “Air Force One” aircraft with a new, modified 747-8. The VC-25B will provide the President, staff, and guests with safe and reliable air transportation at the same level of security and communications capability available in the White House.



Due to advancing age, the VC-25A is experiencing increasing out of service times – currently well over a year for heavy maintenance to maintain compliance with Federal Aeronautics Administration air worthiness standards.

Mission: Provides safe, secure, worldwide transport to ensure the President can execute the constitutional roles of Commander-in-Chief, Head of State, and Chief Executive.

FY 2020 Program: Continues Engineering and Manufacturing Development acquisition phase and modifications to the commercial aircraft to field the capability by 2024.

Prime Contractor(s): The Boeing Company; Seattle, WA

VC-25B Presidential Aircraft Recapitalization										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	418.5	-	657.9	-	757.9	-	-	-	757.9	-
Procurement	-	-	-	-	-	-	-	-	-	-
Total	418.5	-	657.9	-	757.9	-	-	-	757.9	-

Numbers may not add due to rounding

F-22 Raptor



The F-22 Raptor is a fifth-generation air superiority aircraft fighter. The Raptor is designed to penetrate enemy airspace and achieve first-look, first-kill capability against multiple targets. It has unprecedented survivability and lethality, ensuring the Joint Forces have freedom from attack, freedom to maneuver, and freedom to attack.



Mission: Provides the U.S. enhanced air superiority/global strike capability to counter and defeat air-air and air-ground threats in a highly contested environment by conducting counter air, Destruction of Enemy Air Defenses (DEAD) and cruise missile defense missions.

FY 2020 Program: Continues critical planned modernization for F-22 aircraft via incremental capability upgrades and key reliability and maintainability improvements. Continues the evolutionary modernization effort through incremental development phases that enhance the F-22 Air Superiority and Global Strike capabilities in a contested environment. Continues Increment 3.2B modernization, to include integration of AIM-120D and AIM-9X, additional electronic protection, and improved geolocation. Continues critical Sensor Enhancement development upgrade efforts initiated in FY 2019, in support of a fielding decision planned in FY 2020 to meet advanced threats in 2025 and beyond.

Prime Contractor(s): Lockheed Martin; Marietta, GA and Fort Worth, TX (airframe)
Pratt & Whitney; Hartford, CT (engine)

F-22 Raptor										
	FY 2018		FY 2019		FY 2020					
					Base Budget		OCO Budget		Total Request	
	\$M	Qty	\$M	Qty	\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	594.5	-	584.7	-	496.3	-	-	-	496.3	-
Procurement	271.9	-	325.2	-	323.6	-	-	-	323.6	-
Total	866.4	-	909.9	-	819.9	-	-	-	819.9	-

Note: Includes Modification Program

Numbers may not add due to rounding

F-15 Eagle

The F-15C/D is a twin engine (F-15C single seat; F-15D dual seat), supersonic, all-weather, day/night, air superiority fourth-generation fighter aircraft. The F-15E is a twin engine, dual seat, supersonic dual-role, day/night, all-weather, deep interdiction fighter with multi-role air-to-air/air-to-ground capabilities.



USAF Photo

Mission: Supports the fifth-generation fighter fleet to gain and maintain air superiority and provide global precision attack over the battlefield.

FY 2020 Program: Initiates a new program to procure the F-15EX, which will initially refresh the F-15C/D fleet with a planned buy of 144 aircraft, with the potential to refresh the remainder of the F-15C/D fleet and the F-15E fleet. Continues the F-15E Radar Modernization Program (RMP) to replace the legacy radar using existing technology from other aviation platforms and solve parts obsolescence problems to provide improved reliability and performance (increased synthetic aperture radar range and resolution), including air-to-air and air-to-ground modes. Continues the F-15C/D radar upgrade program through FY 2021 to replace the mechanically-scanned antenna on F-15C/D aircraft with an active electronically scanned array (AESA). Continues technology maturation efforts for the Eagle Passive/Active Warning Survivability System (EPAWSS) to improve F-15E survivability by enhancing the ability to detect, deny, or defeat air and ground threats. Continues the development of an Infrared Search and Track System intended to provide an air-to-air targeting capability in a radar denied environment.

Prime Contractor(s): Boeing; St. Louis, MO

F-15EX / F-15 Eagle Mod										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
F-15EX										
RDT&E	-	-	-	-	67.4	-	-	-	67.4	-
Procurement	-	-	-	-	1,050.0	8	-	-	1,050.0	8
Subtotal	-	-	-	-	1,117.4	8	-	-	1,117.4	8
F-15 Mods										
RDT&E	510.4	-	340.3	-	316.0	-	-	-	316.0	-
Procurement	452.8	-	664.1	-	632.7	-	-	-	632.7	-
Subtotal	963.2	-	1,004.3	-	948.7	-	-	-	948.7	-
Total	963.2	-	1,004.3	-	2,066.1	8	-	-	2,066.1	8

Note: Includes Modification Program

Numbers may not add due to rounding

Combat Rescue Helicopter (CRH)



The Combat Rescue Helicopter (CRH) Program, formerly referred to as HH-60 Recapitalization, will replace the aging HH-60G helicopter. The HH-60 Pave Hawk is the U.S. Air Force version of the U.S. Army's UH-60 Black Hawk, modified for Combat Search and Rescue (CSAR) in all-weather situations. The CRH program will leverage in-service production air vehicles and training systems and then integrate existing technologies and missions systems to acquire a new system. Onboard defensive capabilities will permit the CRH system to operate in an increased threat environment. An in-flight refueling capability will provide an airborne ready alert capability and extend its combat mission range. The CRH program plans to procure a total of 112 aircraft.



USAF Photo

Mission: Conduct day and night marginal weather CSAR in order to recover downed aircrew and isolated personnel in hostile environments. The CRH will perform a wide array of collateral missions, including casualty evacuation (CASEVAC), medical evacuation (MEDEVAC), non-combat evacuation operations, civil search and rescue, international aid, disaster humanitarian relief, and insertion/extraction of combat forces.

FY 2020 Program: The program will procure the second Low Rate Initial Production lot of 12 aircraft in FY 2020 with associated initial spares, support equipment, depot-stand up activity, site activation support, training, and other program management administration activities.

Prime Contractor(s): Sikorsky Aircraft Corporation; Stratford, CT

Combat Rescue Helicopter										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	342.0	-	445.7	-	247.0	-	-	-	247.0	-
Procurement	-	-	660.4	10	884.2	12	-	-	884.2	12
Total	342.0	-	1,106.1	10	1,131.3	12	-	-	1,131.3	12

Numbers may not add due to rounding

Advanced Pilot Training (T-X)

The Advanced Pilot Training System, ‘T-X’, will replace the Air Education and Training Command’s fleet of T-38C aircraft, currently based in Mississippi, Oklahoma, and Texas. The T-X program will provide aircraft, simulators, and advanced training capabilities needed to train future Air Force pilots to fly fourth and fifth-generation fighter aircraft. The aircraft, with modern simulators, will enable a pilot training process that produces pilots at a rate that meets the needs of the Air Force for the next several decades.



Mission: The T-X aircraft and simulators will provide student pilots, in the Specialized Undergraduate Pilot Training advanced phase and Introduction to Fighter Fundamentals, the skills and competencies required to more effectively transition into fourth and fifth-generation fighter and bomber aircraft. The aircraft and maintenance simulators will encompass a full range of physical devices and instructional techniques (e.g., traditional classroom, online training, and virtual training).

FY 2020 Program: Conducts a Ground Based Training System Critical Design Review and continue developmental test and evaluation of the Engineering and Development aircraft. The Maintenance Training System Request for Proposal will also be released.

Prime Contractor(s): The Boeing Company; St. Louis, MO

Advanced Pilot Training (T-X)										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	82.6	-	245.5	-	348.5	-	-	-	348.5	-
Procurement	-	-	-	-	-	-	-	-	-	-
Total	82.6	-	245.5	-	348.5	-	-	-	348.5	-

Numbers may not add due to rounding

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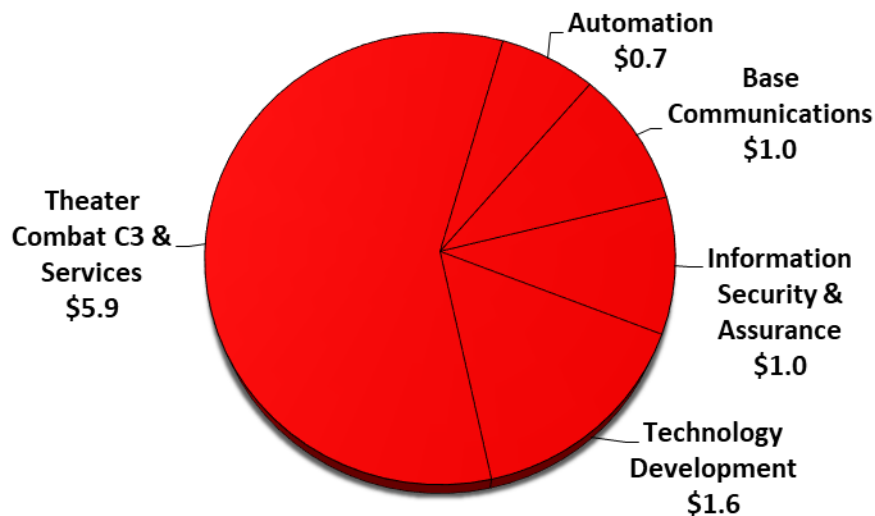
Command, Control, Communications, Computers, and Intelligence (C4I) Systems

Consistent with the National Defense Strategy's (NDS) line of effort, "Build a More Lethal Force.", the Department is well underway in transforming and developing new concepts for the conduct of future joint military operations to achieve full spectrum dominance. This overarching goal to defeat any adversary or control any situation across the full range of military operations is achieved through a broad array of capabilities enabled by an interconnected network of sensors, shooters, command, control, and intelligence. Net-centricity transformed the way that information is managed to accelerate decision making, improve joint warfighting, and create intelligence advantages. U.S. forces are heavily-networked and require reliable secure trusted access to information and depend upon network-based interconnectivity for increased operational effectiveness. By enhancing information sharing, dispersed forces are able to communicate, maneuver, share a common user-defined operating picture, and successfully complete assigned missions more efficiently.

The FY 2020 budget request supports the net-centricity service-based architecture pattern for information sharing. It is being implemented by the C4I community via building joint architectures and roadmaps for integrating joint airborne networking capabilities with the evolving ground, maritime, and space networks. It encompasses the development of technologies like gateways, waveforms, network management, and information assurance.

FY 2020 C4I Systems Total: \$10.2 Billion

\$ in Billions



Numbers may not add due to rounding

Warfighter Information Network - Tactical

USA

The Warfighter Information Network-Tactical (WIN-T) is the high speed, high capability backbone for the Army’s tactical network. The tactical network underpins mission command At-The-Halt and On-The-Move (OTM), keeping highly mobile and dispersed forces in the battlefield connected to one another from theater down to select company roles. The WIN-T backbone allows battlefield forces on the tactical network to leverage Army and Joint resources through the Department of Defense Information Network (DoDIN). The tactical network provides reliable, secure, and seamless video, data, imagery, and voice services to enable decisive combat actions in any environment. Increment 1 provides “Networking At-The-Halt” by upgrading the Joint Network Node satellite capability to access the Wideband Global Satellite constellation. Increment 2 (Inc 2) provides OTM to the company level.



Mission: Using satellite and terrestrial communications, the WIN-T delivers fully mobile, flexible, dynamic networking capability enabling Joint land forces to engage enemy forces deeper and more effectively. The WIN-T Inc 2 introduces a mobile, ad-hoc, self-configuring, self-healing network using satellite OTM capabilities, robust network management, and high-bandwidth radio systems to keep mobile forces connected, communicating, and synchronized. The WIN-T Inc 2 OTM transitions to sustainment at the end of FY 2021.

FY 2020 Program: Funds the WIN-T Increment 2 new equipment fielding and initial spares to one Stryker Brigade Combat Team (SBCT). Provides modernization of 4 Networking OTM Infantry Brigade Combat Teams (IBCT), 1 Networking OTM SBCT, and 2 Networking OTM Divisions.

Prime Contractor(s): General Dynamics Corporation; Taunton, MA
Lockheed Martin Corporation; Gaithersburg, MD

Warfighter Information Network-Tactical										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	-	-	-	-	-	-	-	-	-	-
Procurement	517.0	-	631.1	-	434.1	-	40.0	-	474.1	-
Total	517.0	-	631.1	-	434.1	-	40.0	-	474.1	-

Numbers may not add due to rounding

Handheld, Manpack, and Small Form Fit Radio



The Handheld, Manpack, and Small Form Fit (HMS) program procures radios that are software reprogrammable, networkable, multi-mode systems capable of simultaneous voice and data communications. The HMS program encompasses the one-channel Rifleman Radio (RR), two-channel Leader Radio (LR), Manpack Radio (MP), and Small Form Fit (SFF) radio. The RR is a handheld radio that connects Soldiers at the lowest echelon of the Army network by providing one-channel secure voice and data communications primarily at the squad level. The LR is a multiband two-channel handheld radio used at the Team, Squad, and Platoon levels. The LR will simultaneously support Single Channel Ground and Airborne Radio System (SINCGARS) voice interoperability and other advanced networking waveform communications in one radio with both dismounted and mounted configurations. The MP radio is a certified Type 1 radio used for transmission of up to Secret information. The MP is capable of providing two simultaneous channels of secure voice and data communications using SINCGARS, Demand Assigned Multiple Access Satellite Communication, Mobile User Objective System, and future Army networking waveforms.



Mission: Provide voice and data communications to the tactical edge and the expeditionary Warfighter with an On-The-Move, At-The-Halt, and stationary Line of Sight/Beyond Line of Sight capability for both dismounted personnel and mounted platforms. The LR and MP extend the network down to the Team/Squad leader. These networking tactical radio systems are interoperable with specified radios in the current force.

FY 2020 Program: Funds the full and open competition contract strategy for the LR and MP radios. Provides for testing of the LR and MP candidate products to demonstrate compliance with program requirements to assess effectiveness, suitability, and survivability and to obtain material release for the Full Rate Production. Supports safety, spectrum supportability, and certifications necessary to prepare the products for fielding. Procures up to four Brigade Combat Team (BCT) LR and MP radios, support equipment, fielding, non-recurring engineering, and platform vehicle integration.

Prime Contractor(s): Harris Radio Corporation; Rochester, NY
 Thales Communications Incorporated; Clarksburg, MD
 Collins Aerospace; Cedar Rapids, IA

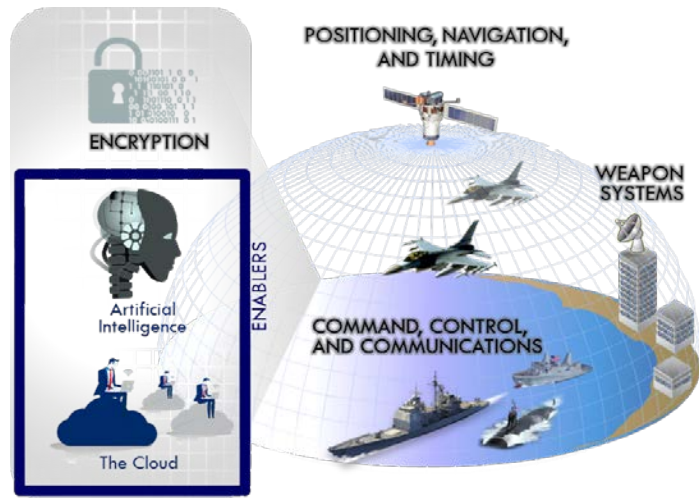
Handheld, Manpack, and Small Form Fit Radio										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	8.8	-	3.8	-	35.7	-	-	-	35.7	-
Procurement	415.4	-	298.5	-	468.0	-	-	-	468.0	-
Total	424.2	-	302.3	-	503.7	-	-	-	503.7	-

Numbers may not add due to rounding

Cyberspace

DOD - JOINT

The Department of Defense (DoD) released a new DoD Cyber Strategy in September 2018 that articulates how the Department will implement priorities of the National Defense Strategy in and through cyberspace. The central challenge identified in the Strategy acknowledges that the U.S. prosperity and security depend on open and reliable access to information. Some nations that are deterred from directly confronting U.S. military strength are using cyberspace operations in day-to-day competition to exploit a perceived advantage and harm our interests. China and Russia are engaging in great power competition, which includes persistent, aggressive cyberspace campaigns that pose strategic, long-term risks to the Nation, our allies, and partners. In response to the growing cybersecurity threats, the Department established Cyberspace Planning Priorities to guide the development of DoD’s cyber forces and strengthen cybersecurity and cyber deterrence postures.



Mission: Ensure the Joint Force can achieve its missions in a contested cyberspace domain; enhance Joint Force military advantages through the integration of cyber capabilities into planning and operations; deter, preempt, or defeat malicious cyber activity targeting U.S. critical infrastructure; secure DoD information and systems; expand DoD cyber cooperation with allies, partners, and private sector entities.

FY 2020 Program: Funds cybersecurity capabilities in the following focus areas: end point management; identity, credential, and access management (ICAM); insider threat security; secure application development; cross-domain security to include mission partner networks; supply chain risk management; encryption; other critical infrastructure. Increases cyberspace warfighting capabilities and continues development of the Unified Platform. Supports weapon system and critical infrastructure vulnerability assessments and mitigation efforts.

Cyberspace										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	1,795.9	-	2,006.2	-	2,000.7	-	-	-	2,000.7	-
Procurement	737.2	-	587.1	-	843.9	-	-	-	843.9	-
Total	2,533.1	-	2,593.3	-	2,844.5	-	-	-	2,844.5	-

Numbers may not add due to rounding

Ground Systems

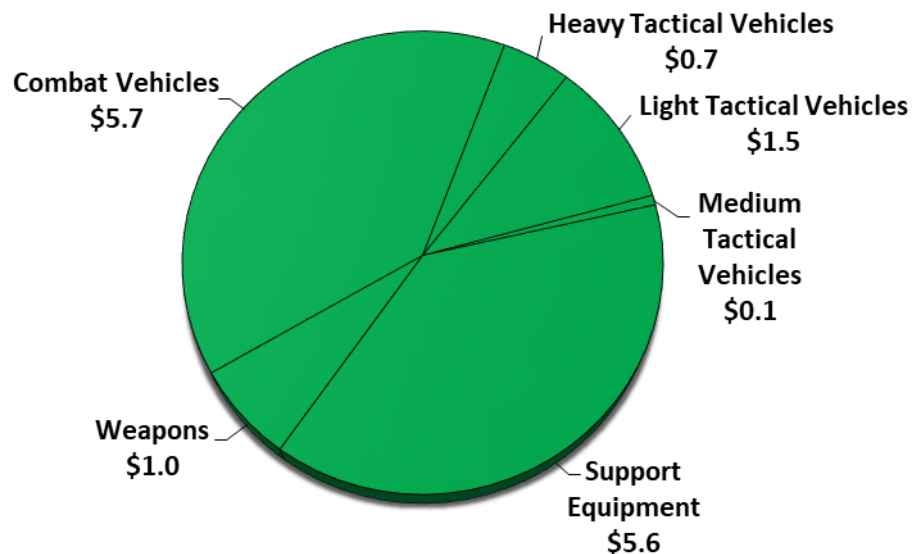
The Department is modernizing its ground force capabilities to ensure the United States remains a dominant force capable of operating in all environments across the full spectrum of conflict. The Army and Marine Corps equip each soldier and Marine with the best equipment available to succeed in both today's and tomorrow's operations. Ongoing technology research and concept exploration will benefit future Army and Marine Corps combat portfolios.

The ground forces modernization plan addresses the challenges of the future operational environment and directly supports the National Defense Strategy's (NDS) line of effort, "Build a More Lethal Force." In addition to upgrades to legacy equipment, the overall strategy intends to embrace new capability, like the Armored Multi-Purpose Vehicle (AMPV) and the Amphibious Combat Vehicle (ACV), as well as look into the future with the development of the Next Generation Combat Vehicle (NGCV). NGCV will comprise of a fleet of vehicles with enhanced capabilities and a greater commonality of parts and components to simplify logistics and maintenance.

The Army continues to modernize and upgrade select Major Defense Acquisition Programs in FY 2020 request, including Stryker vehicles, upgrading the Abrams Main Battle Tank to the M1A2 System Enhancement Package (SEP) V3 configuration, the M2 Bradley Fighting Vehicles, the M109A7 Paladin 155mm howitzers and the Armored Multi-Purpose Vehicle (AMPV). The Marine's ground force focus in FY 2020 is on the Amphibious Combat Vehicle (ACV). The ACV will deliver shore and sea-based infantry to the battlefield in vehicles designed for future operational environments. All the Services will procure the Joint Light Tactical Vehicle (JLTV) as part of the Low Rate Initial Production (LRIP).

FY 2020 Ground Systems Total: \$14.6 Billion

\$ in Billions



Numbers may not add due to rounding

Joint Light Tactical Vehicle

DOD - JOINT

The Joint Light Tactical Vehicle (JLTV) is a joint program currently in development for the Army and Marine Corps. The JLTV is intended to replace the High Mobility Multipurpose Wheeled Vehicle (HMMWV), which is the current light tactical vehicle. The JLTV concept is based on a family of vehicles focused on scalable armor protection and vehicle agility, and mobility required of the light tactical vehicle fleet. The JLTV will provide defensive measures to protect troops while in transport, increase payload capability, and achieve commonality of parts and components to reduce the overall life cycle cost of the vehicle. The JLTV project optimizes performance, payload, and protection of the crew and vehicle while ensuring a design that is transportable by CH-47, CH-53, and C-130 aircraft. The program achieved Milestone C in August 2015.



Mission: Provide a light tactical vehicle capable of performing multiple mission roles, and providing protected, sustained, networked mobility for personnel and payloads across the full range of military operations. There are two variants planned: Combat Support Vehicles (3,500 lbs.) and Combat Tactical Vehicles (5,100 lbs.).

FY 2020 Program: Procures more than 4,000 JLTVs of various configurations to fulfill the requirements of multiple mission roles and minimize ownership costs for the Light Tactical Vehicle fleet.

Prime Contractor(s): Oshkosh Corporation; Oshkosh, WI

Joint Light Tactical Vehicle										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E USA	22.5	-	-	-	2.7	-	-	-	2.7	-
RDT&E USMC	19.5	-	-	-	2.1	-	-	-	2.1	-
Procurement USA	834.4	2,176	1,279.4	3,393	996.0	2,530	-	-	996.0	2,530
Procurement USAF	51.3	121	46.2	50	32.0	65	41.0	75	73.0	140
Procurement USN	1.3	3	3.4	8	9.6	22	-	-	9.6	22
Procurement USMC	233.4	527	599.3	1,642	558.1	1,398	-	-	558.1	1,398
Total	1,162.4	2,827	1,928.3	5,093	1,600.6	4,015	41.0	75	1,641.6	4,090

Numbers may not add due to rounding

M-1 Abrams Tank Modification/Upgrades

USA

The M1A2 Abrams is the Army’s main battle tank, which first entered service in 1980. It was produced from 1978 until 1994. Since then, the Army has modernized it with a series of upgrades to improve its capabilities, collectively known as the System Enhancement Package (SEP) and Engineering Change Proposals (ECPs). Current modifications to the M1 Abrams



US Army Photo

include an updated Armor suite, Ammunition Data Link, Commander’s Remote Operated Weapon Station – Low Profile, Under Armor Auxiliary Power Unit, Electronics Upgrades, and Power Train Improvement & Integration Optimization, which provide more reliability, durability and fuel efficiency. Survivability enhancements include Active Protection System upgrades.

Mission: Provide mobile and protected firepower for battlefield superiority against heavy armor forces.

FY 2020 Program: Funds continuation of M1A2 SEpv3 (ECP 1A - Power) testing, continues M1A2 SEpv4 (ECP IB - lethality improvements) development, and continues the testing of the Trophy Active Protective System (APS) Non-Development Item (NDI) effort leading to an Urgent Material Release (UMR) in the first quarter of FY 2019. Provides the upgrade of 165 M1A1 vehicle variants to the M1A2SEP v3 variant. Funds continued Trophy A&B kit logistics technical support and numerous approved modifications to fielded M1A2 Abrams tanks; (e.g., Ammunition Data Link (ADL) to enable firing of the Army’s new smart 120mm ammunition and Commander’s Remote Operating Weapon Station – Low Profile (CROWS-LP)).

Prime Contractor(s): General Dynamics Corporation; Lima, OH

M-1 Abrams Tank Modification/Upgrades										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	93.7	-	165.7	-	119.6	-	-	-	119.6	-
Procurement	1,690.3	120	2,486.3	168	2,101.6	165	13.1	-	2,114.7	165
Total	1,784.0	120	2,652.0	168	2,221.2	165	13.1	-	2,234.3	165

Numbers may not add due to rounding

Armored Multi-Purpose Vehicle

The Armored Multi-Purpose Vehicle (AMPV) will replace the M113 Armored Personnel Carrier program that was terminated in 2007. The AMPV will have five mission roles: General Purpose, Medical Treatment, Medical Evacuation, Mortar Carrier and Mission Command. The current M113 Armored Personnel Carrier Mission Equipment Packages (MEPs) will be integrated onto a new hull structure based on the Bradley Fighting Vehicle design to give the Army its required capability at an affordable cost.



Mission: Enables the Armored Brigade Combat Team (ABCT) commander to control a relentless Optempo that overwhelms the threat with synchronized and integrated assaults that transition rapidly to the next engagement.

FY 2020 Program: Funds the AMPV Engineering and Manufacturing Development (EMD) phase and testing to include Production Qualification Testing (PQT), the Production and Deployment phase Live Fire Test and Evaluation (LFT&E), and potential design efforts to address changes stemming from the tests and/or to satisfy Army requirements. The program will procure 65 Low Rate Initial Production vehicles. Additionally, OCO funding will procure 66 AMPV platforms to support the COCOM requirement for unit equipment sets to deter potential adversaries and support the European Deterrence Initiative (EDI).

Prime Contractor(s): BAE Systems; York, PA

Armored Multi-Purpose Vehicle (AMPV)										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	184.3	-	111.8	-	96.7	-	-	-	96.7	-
Procurement	558.3	131	672.7	197	264.0	65	221.6	66	485.6	131
Total	742.6	131	784.5	197	360.7	65	221.6	66	582.3	131

Numbers may not add due to rounding

Paladin Integrated Management (PIM)

USA

The M109 Family of Vehicles (FOV) consists of the M109A6 Paladin 155mm Howitzer, which is the most advanced self-propelled cannon system in the Army, and the Field M992A2 Artillery Ammunition Support Vehicle (FAASV), an armored resupply vehicle. The Paladin Integrated Management (PIM) program addresses obsolescence, space, weight, and power concerns and ensures sustainment of the M109 FOV through 2050. The PIM replaces the current M109A6 Paladin and M992A2 FAASV vehicles with a more robust platform, incorporating the M2 Bradley common drive train and suspension components. The PIM fills the capability gap created by cancellation of the Non-Line of Sight Cannon (NLOS-C), a component of the Future Combat System program in 2009. Currently in Low-Rate Initial Production (LRIP).



Mission: Provide the primary indirect fire support for Armored Brigade Combat Teams, armored and mechanized infantry divisions as well as an armored resupply vehicle.

FY 2020 Program: Funds operations that sustain production operations required to acquire materials, components and end items; the manufacturing and assembly of sub-systems; the integration, test and check-out operations that results in the production of 53 Sets.

Prime Contractor(s): BAE Systems; York, PA

Paladin Integrated Management (PIM)										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	5.9	-	-	-	-	-	-	-	-	-
Procurement	772.1	73	525.9	51	553.4	53	-	-	553.4	53
Total	778.0	73	525.9	51	553.4	53	-	-	553.4	53

Numbers may not add due to rounding

Family of Medium Tactical Vehicles



The FMTV is a family of vehicles based on a common chassis with automatic transmission, which varies by payload and mission requirements. FMTV variants consist of: Light Medium Tactical Vehicle 2½ Ton Cargo, Van, and Low Velocity Air Drop (LVAD) models; Medium Tactical Vehicle 5 Ton Cargo Standard Wheelbase, Long Wheelbase, Tractor, LVAD Cargo, Expansible Van, 5 Ton Dump, 5 Ton LVAD Dump, Wrecker, 10 Ton Dump, and 8.8 Ton Load Handling System (LHS); and three types of companion trailers. Eighty percent of the FMTV parts are common with similar engines, transmissions, drivelines, power trains, tires, and cabs. It operates throughout the theater as a multipurpose transportation and unit mobility vehicle by Combat, Combat Support, and Sustainment units.



DoD Photo

Mission: Provides unit mobility and resupply of equipment and personnel for rapidly deployable worldwide operations on primary and secondary roads, trails, cross-country terrain, and in all climatic conditions.

FY 2020 Program: Funds the procurement of 142 various Armor Capable Medium Tactical Vehicle Trucks and Trailers. The various Medium Tactical Vehicles fill the 5-ton truck, 2-1/2 ton truck, and the 5-ton trailer requirements to fulfill Army modularity requirements and modernize the medium fleet, reduce operating and support costs, resolve potential operational deficiencies and operate throughout the theater as a multi-purpose transportation vehicle used by combat, combat support and combat service support units. .

Prime Contractor(s): Oshkosh Defense, LLC; Oshkosh, WI

Family of Medium Tactical Vehicles (FMTV)										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget \$M	Base Budget Qty	OCO Budget \$M	OCO Budget Qty	Total Request \$M	Total Request Qty
RDT&E	5.8	-	3.7	-	2.2	-	-	-	2.2	-
Procurement	272.9	753	169.1	382	106.7	142	-	-	106.7	142
Total	278.7	753	172.8	382	108.8	142	-	-	108.8	142

Numbers may not add due to rounding

Family of Heavy Tactical Vehicles

USA

The Family of Heavy Tactical Vehicles (FHTV) consists of the Palletized Load System (PLS), the Heavy Expanded Mobility Tactical Truck (HEMTT), the Modular Catastrophic Recovery System (MCRS), and the Heavy Equipment Transporter System (HETS). The PLS is a 16.5 ton, 10 wheel tactical truck with self-load/unload capability. The PLS carries its payload on flat rack cargo bed, trailer, or International Standards Organization (ISO) containers. The HEMTT is a 10 ton, 8 wheel (8x8) truck that comes in several configurations: Tanker to refuel tactical vehicles and helicopters, Tractor to tow the Patriot missile system and the Multi-Launch Rocket System (MLRS), Wrecker to recover vehicles, and Cargo truck with a material handling crane. The MCRS is comprised of the Prime Mover (M983A4 LET), Fifth Wheel Towing Recovery Device (FWTRD), and the Tilt Deck Recovery Trailer (TDRT). Coupled with the Prime Mover, the MCRS is capable of recovering all Stryker variants and an estimated 95 percent of Mine Resistant Ambush Protected (MRAP) vehicles currently in theater. The HETS is comprised of the M1070A1 Tractor and M1000 Trailer.



Army photo of a PLS

Mission: Provide transportation of heavy cargo to supply and re-supply combat vehicles and weapons systems. The PLS is fielded to transportation units, ammunition units, and to forward support battalions with the capability to self-load and transport a 20 ft. ISO container. The upgraded HEMTT A4 is an important truck to transport logistics behind quick-moving forces such as the M-1 Abrams and Stryker. The HEMTT family carries all types of cargo, especially ammunition and fuel, and is used for line haul, local haul, unit resupply, and other missions throughout the tactical environment to support modern and highly mobile combat units. The MCRS is designed to recover large wheeled vehicle platforms in severe off-road conditions either in lift/toe or transport mode. The HETS is used to transport, recover, and evacuate a combat loaded M1 Series main battle tank, an M88, or similar heavy loads.

FY 2020 Program: Funds the procurement of 1,445 vehicles within the FHTVs; which includes, trailers to modernize the heavy tactical vehicle fleet for the Active, National Guard, and Reserve units and to fill urgent theater requirements.

Prime Contractor(s): Oshkosh Corporation; Oshkosh, WI

Family of Heavy Tactical Vehicles										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	10.1	-	11.9	-	16.7	-	-	-	16.7	-
Procurement	110.2	1,498	160.9	1,168	10.0	1,100	26.9	345	36.9	1,445
Total	120.3	1,498	172.8	1,168	26.7	1,100	26.9	345	53.6	1,445

Numbers may not add due to rounding

Ground Mobility Vehicle

USA

The Army Ground Mobility Vehicle (GMV) provides enhanced tactical mobility for an Infantry Brigade Combat Team (IBCT) 9-Soldier infantry squad with their associated equipment to move quickly around the battlefield. This capability is required across the range of military operations facing IBCT units conducting crisis response, initial entry, and selected decisive action missions. GMV deploys worldwide by sea, air, and land modes to support strategic deployment and operational maneuver in accordance with Army and Joint doctrine. This capability provides flexibility for entry operations (permissive and non-permissive) to counter threat anti-access strategies by using multiple austere entry points to bring in combined arms configured units.



A-GMV 1.1

Mission: GMV enables entry forces to envelop, infiltrate, and penetrate in and/or across multiple domains at select points of entry to place the enemy at an operational disadvantage. This maneuver capability in multiple domains presents many threats to the adversary, overloading his decision cycle and allowing the Joint Force to seize and retain the initiative.

FY 2020 Program: Procures 69 GMVs to support production of the USASOC Version of the GMV1.1 SOCOM Vehicle, and the procurement of 15 Infantry Squad Vehicle (ISV). Ground Mobility Vehicle variants directly support the National Defense Strategy's intent to increase "Forward force maneuver and posture resilience" by providing increased capability for the Soldier to "deploy, survive, operate, maneuver, and regenerate in all domains while under attack". A- GMV 1.1, and ISV provide the necessary flexibility for entry operations (permissive and non-permissive) to counter threat anti-access strategies by using multiple austere entry points by sea, air, and land, and provide increased capability for the Infantry Brigade Combat Team to conduct decisive action missions as well as crisis response.

Prime Contractor(s): A-GMV1.1: General Dynamics-Ordnance and Tactical Systems; St. Petersburg, FL
 Infantry Squad Vehicle (ISV): TBD

Ground Mobility Vehicle										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	3.6	-	1.3	-	3.0	-	-	-	3.0	-
Procurement	40.9	108	42.7	106	37.0	84	-	-	37.0	84
Total	44.6	108	44.0	106	40.0	84	-	-	40.0	84

Numbers may not add due to rounding

Stryker Family of Armored Vehicles

USA

Stryker is a 19-ton wheeled armored vehicle that provides the Army with a family of 24 different vehicles (10 flat bottom, 7 Double V-Hull, 7 Double V-Hull A1)). The Stryker can be deployed by C-130 (flat bottom only), C-17, and C-5 aircraft and be combat-capable upon arrival in any contingency area. There are two basic versions, which include the Infantry Carrier Vehicle (ICV) and the Mobile Gun System (MGS) with eight different configurations, which include the Reconnaissance Vehicle (RV); Anti-Tank Guided Missile (ATGM); Nuclear, Biological, Chemical, and Radiological Vehicle (NBCRV); Medical Evacuation Vehicle (MEV); Commander’s Vehicle (CV); Fire Support Vehicle (FSV); Mortar Carrier (MC); and Engineer Squad Vehicle (ESV).



US Army Photo

Mission: The Stryker provides rapid protected transport to the Infantry and Scouts of the Stryker Brigade Combat Team (SBCT) allowing them to maneuver in close and urban terrain across the full spectrum of operations. Achieves the Army’s goal to equip a strategically deployable brigade using a C-17 or C-5 aircraft and an operationally deployable brigade using a C-130 that is capable of rapid movement anywhere on the globe enabling the Army to respond immediately to urgent operational requirements.

FY 2020 Program: Completes funding for Engineering Change Proposal (ECP) 1, ECP 2 lethality engineering development, and continues support of the application of multiple fleet-wide modifications. Modifications address the following areas: Training Devices; obsolescence, reliability, capability and performance degradation; safety; and operational-related issues. Provides for the logistical support of a 30mm weapon system and the procurement application of lethality ECPs modifications. Procures the Exchange of 152 Stryker Flat Bottom vehicles configured as Double V Hull A1 ECP vehicles.

Prime Contractor(s): General Dynamics Corporation; Sterling Heights, MI

Stryker Family of Armored Vehicles										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	63.0	-	50.3	-	56.4	-	-	-	56.4	-
Procurement	918.3	207	392.6	82	694.4	152	4.1	-	698.5	152
Total	981.3	207	442.9	82	750.8	152	4.1	-	754.9	152

Numbers may not add due to rounding

Amphibious Combat Vehicle (ACV)



The Amphibious Combat Vehicle (ACV) will replace the aging Amphibious Assault Vehicle. The Marine Corps has refined its ACV strategy based on several factors including; knowledge gained through multiyear analysis and ongoing development of its Ground Combat Tactical Vehicle Strategy. The ACV acquisition strategy awarded two competitive Engineering, Manufacturing, and Development (EMD) contracts to two vendors to build 16 test vehicles each (32 total) in November 2015. ACV 1.1 completed Milestone C in June 2018, at which time the program down selected to one vendor and awarded the Low Rate Initial Production (LRIP) contract to BAE Systems.



Mission: Provide an armored personnel carrier balanced in performance, protection, and payload for employment with the Ground Combat Element across the range of military operations, including a swim capability. The program has been structured to provide a phased, incremental capability. ACV Increment 1.1 will deliver combat ready Marines from ship-to-shore connector craft in order to mass forces at littoral penetration points and continue to maneuver onward to inland objectives. The Approved Acquisition Objective (AAO) is 204 vehicles. ACV Increment 1.2 will deliver additional ACV 1.1 Personnel Variants (currently in production) as well as Command and Control (ACV-C), Recovery (ACV-R), and 30-mm (ACV-30) Mission Role Variants (MRVs). The approved AAO is 490 vehicles.

FY 2020 Program: Funds the ACV 1.1 Full Rate Production (FRP) Lot 3 of 56 vehicles, plus procurement of related items such as production support, systems engineering, program management, Engineering Change Orders (ECOs), Government Furnished Equipment (GFE), and integrated logistics support. Research and Development efforts include the procurement of ACV 1.2 MRV test articles, associated GFE, and initiation of a Vehicle Protective System trade study and integration efforts.

Prime Contractor(s): BAE Systems; York, PA

Amphibious Combat Vehicle (ACV)										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	150.4	-	66.1	-	77.3	-	-	-	77.3	-
Procurement	156.7	26	167.5	30	317.9	56	-	-	317.9	56
Total	307.1	26	233.6	30	395.3	56	-	-	395.3	56

Numbers may not add due to rounding

Missile Defeat and Defense Programs

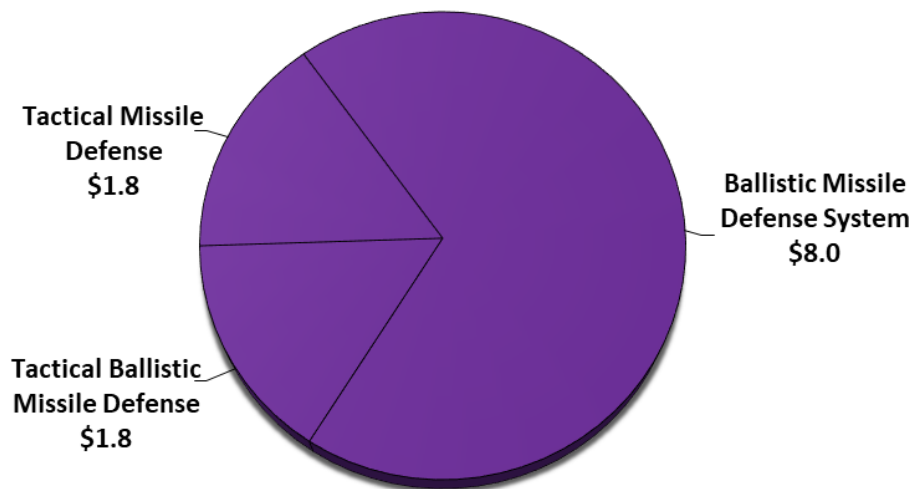
This category includes development and procurement of weapon systems to counter adversary’s offensive cruise missiles and ballistic missile systems. The Missile Defense Agency (MDA) is specifically tasked to lead the Department’s missile defense mission, however, all three Military Departments have acquisition and operational roles in missile defeat and defense. A missile defense system includes interceptor missiles, as well as the associated sensors and command, control, battle management, and communications. Other significant investments include construction, targets and countermeasures, and the RDT&E activities. Encompassed in this category are all programs that are either critical to the functionality of missile defense or support missile defense as a primary mission. The Aegis is the naval element of the Ballistic Missile Defense System (BMDS) and provides an enduring, operationally effective and supportable Ballistic Missile Defense (BMD) capability on Aegis cruisers, destroyers, and Ashore.

The funded program is consistent with the National Defense Strategy's (NDS) line of effort, "Build a More Lethal Force" and the Missile Defense Review (MDR), which calls for the development and fielding of a multi-layered defense of the homeland and forward-deployed forces.

The FY 2020 budget request continues funding for projects started in 2017 for the Missile Defeat and Defense Enhancements (MDDE) initiative to increase the capability and capacity of the United States to detect, disrupt/defeat (left-of-launch), and defend against any North Korean use of ballistic missiles against the United States, its deployed forces, allies, and partners, to include current and projected threats to the U.S. Homeland, Guam, South Korea, and Japan. The FY 2020 budget request also increases air and missile defense interceptor inventories for the Patriot Advanced Capability-3 (PAC-3) Missile Segment Enhancement (MSE), Standard Missile-3 (SM-3), and Terminal High Altitude Area Defense (THAAD) programs, and it invests in development efforts for future capabilities. In addition, the FY 2020 request includes funding for studies into the implementation of a space layer consisting of sensors and interceptors.

FY 2020 Missile Defeat and Defense Programs Total: \$11.6 Billion

\$ in Billions



Numbers may not add due to rounding

Note: Does not include the Missile Defense Agency’s (MDA) Science and Technology (\$58 million), Military Construction (\$45 million), and Operation and Maintenance (\$523 million) funding. The total MDA FY 2020 request is \$9.4 billion. Also does not include an additional \$1.5 billion in Non-Traditional Missile Defeat. Total FY 2020 Missile Defeat and Defense budget is \$13.6 billion.

Ground-based Midcourse Defense

DOD - JOINT

The Ground-based Midcourse Defense (GMD) element is a Missile Defense Agency program and a key component of the Ballistic Missile Defense System, providing Combatant Commanders with the capability to engage ballistic missiles in the midcourse phase of flight. This phase, compared to boost or terminal, allows significant time for sensor viewing from multiple platforms, which provides multiple engagement opportunities for hit-to-kill interceptors. The Ground-based Interceptor (GBI) is made up of a three-stage, solid fuel booster and an exoatmospheric kill vehicle. When launched, the multistage, solid fuel booster missile carries the kill vehicle toward the target’s predicted location in space. Once released from the booster, the kill vehicle uses data received in-flight from ground-based radars and its own on-board sensors to defeat the incoming missile by ramming the warhead with a closing speed of approximately 15,000 miles per hour. Interceptors are currently emplaced at Fort Greely, Alaska and Vandenberg Air Force Base, California with the GMD fire control centers located in Colorado and Alaska.



DoD Missile Defense Agency Photo

Mission: Provide the Combatant Commanders with the capability to defend the United States, including Hawaii and Alaska, against long-range ballistic missiles during the midcourse phase of flight.

FY 2020 Program: Continues to strengthen and expand homeland missile defense by adding a new missile field and deploying 20 additional GBIs at Ft. Greely, Alaska, bringing the total deployed GBIs from 44 to 64. Funds the development of the GMD Redesigned Kill Vehicle (RKV). The RKV will address the evolving threat, enhance kill vehicle reliability, improve in-flight communications to better utilize off-board sensor data. It upgrades and replaces ground system infrastructure, fire control, and kill vehicle software to improve the reliability, capability, and cybersecurity resiliency of the GMD weapon system. Funds Ground and Flight testing in support of the Integrated Master Test Plan requirements.

Prime Contractor(s): Boeing Defense and Space; St. Louis, MO

Ground-based Midcourse Defense										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	1,987.4	-	1,304.3	-	1,667.0	-	-	-	1,667.0	-
Procurement	268.0	10	532.6	16	9.5	-	-	-	9.5	-
<i>GBIs</i>		-	-	4	-	-	-	-	-	-
<i>Silos</i>		10	-	12	-	-	-	-	-	-
Total	2,255.4	10	1,836.9	16	1,676.5	-	-	-	1,676.5	-

Numbers may not add due to rounding

THAAD Ballistic Missile Defense



The Terminal High Altitude Area Defense (THAAD) is a key element of the Ballistic Missile Defense System. The THAAD Battery will provide transportable interceptors, using “Hit-To-Kill” technology to destroy ballistic missiles inside and outside the atmosphere. A Battery consists of 6 truck-mounted launchers, 48 interceptors (8 per launcher), one Army Navy/Transportable Radar Surveillance-2 (AN/TPY-2), and one Tactical Fire Control/Communications component.



Mission: Provide the Combatant Commanders with a globally-transportable, rapidly-deployable, ground-based missile defense capability against short-range, medium-range, and limited intermediate-range ballistic missile threats inside and outside the atmosphere during the terminal phase of flight.

FY 2020 Program: Supports the procurement of 37 THAAD interceptors, obsolescence mitigation, production and training support, and tooling and equipment for the THAAD stockpile reliability and recertification program. Funds THAAD software upgrades to address the evolving threat and defense planning as well as improved capability to engage short-range, medium-range, and limited intermediate-range ballistic missile threats. Funds the United States Forces Korea Joint Emergent Operational Need to provide a more efficient and effective use of systems available in theater and improve Ballistic Missile Defense System capability to the Korean Peninsula. Funds Ground and Flight testing in support of the Integrated Master Test Plan requirements.

Prime Contractor(s): Lockheed Martin Corporation; Dallas, TX and Sunnyvale, CA

Terminal High Altitude Area Defense (THAAD)										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	489.8	-	449.3	-	327.9	-	-	-	327.9	-
Procurement	1,125.7	109	1,014.1	96	425.9	37	-	-	425.9	37
Total	1,615.5	109	1,463.4	96	753.8	37	-	-	753.8	37

Numbers may not add due to rounding

Aegis Ballistic Missile Defense

DOD - JOINT

The Aegis Ballistic Missile Defense (BMD) is the naval element of the Ballistic Missile Defense System (BMDS) and provides an enduring, operationally effective and supportable BMD capability on Aegis cruisers, destroyers, and Ashore. The Aegis BMD builds upon the existing Navy Aegis Weapons System (AWS) and Standard Missile-3 (SM-3) design. Upgrades are being made to the weapon system and SM-3 designs to expand capability through a series of incremental, evolutionary improvements to counter ever more sophisticated and longer range threats.



Mission: Provide a forward-deployable, mobile and Ashore capability to detect and track ballistic missiles of all ranges in all phases of flight with the ability to destroy short- through intermediate-range ballistic missiles in the midcourse and terminal phases.

FY 2020 Program: Procures approximately 30 SM-3 Block IB missiles and 7 SM-3 Block IIA missiles. Integrates SM-3 Block IIA into the BMD Weapon Systems. Continues development of the Aegis BMD 5.1 and Aegis BMD 6 Weapon Systems. Supports procurement of 12 Inline/Back fit shipsets, 5 weapons system upgrades, and 19 installs of the BMD 4.x/5.x equipment. Funds Ground and Flight testing in support of the Integrated Master Test Plan requirements.

Prime Contractor(s): Aegis Weapon System: Lockheed Martin Corporation; Moorestown, NJ
SM-3 Interceptor: Raytheon Company; Tucson, AZ and Huntsville, AL

Aegis Ballistic Missile Defense										
	FY 2018		FY 2019		FY 2020					
					Base Budget		OCO Budget		Total Request	
	\$M	Qty	\$M	Qty	\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	927.2	-	833.3	-	897.3	-	-	-	897.3	-
Procurement (Missiles)	1,083.4	64	700.5	44	697.8	37	-	-	697.8	37
Procurement (HW/SW Installs)	157.4	22	97.1	28	125.0	36	-	-	125.0	36
Total	2,168.0	86	1,630.9	72	1,720.1	73	-	-	1,720.1	73

Numbers may not add due to rounding

Patriot/PAC-3



The Army's Patriot system is an extremely capable, long-range air defense guided missile system, which provides protection of ground combat forces and high-value assets. The Patriot air and missile defense system, which includes the Advanced Capability (PAC-3) missile, provides defense against tactical ballistic missiles, cruise missiles, and air-breathing threats worldwide. The Patriot system is deployed by Fire Unit organized within a Battalion. Each Fire Unit consists of the Engagement Control Station, a Radar Set, an Electric Power Plant, Launching Stations, and the Battery Command Post, including ancillary support equipment. The Patriot Battalion is organized by a Headquarters and Headquarters Battery, exercising command and control through the Information and Coordination Central shelter, with communications support enabled through the Communications Relay Group and Antenna Mast Group. Both the Fire Unit and the Battalion have dedicated support, communications, and maintenance vehicles, with limited missile reload and transport capability via the Guided Missile Transporter. The PAC-3 units are the Combatant Commanders' most capable asset to protect forward deployed forces.



Mission: Contributes to the Ballistic Missile Defense System overall situational awareness for short-range terminal ballistic missile threats. It can cue other systems while protecting Joint assets. The Patriot force is 15 battalions, and many remain forward stationed in multiple theaters of operation.

FY 2020 Program: Continues improvements in software for improved combat identification, improved communications, interoperability, supportability, electronic warfare capabilities; and supports transition to the Integrated Air and Missile Defense architecture.

Prime Contractor(s): Raytheon Integrated Defense Systems; Tewksbury, MA
 Lockheed Martin Missiles and Fire Control; Dallas, TX

Patriot/PAC-3										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	134.8	-	164.5	-	524.2	-	-	-	524.2	-
Procurement	536.5	-	323.2	-	-	-	279.5	-	279.5	-
Total	671.4	-	487.8	-	524.2	-	279.5	-	803.7	-

Numbers may not add due to rounding

PAC-3/MSE Missile



The Missile Segment Enhancement (MSE) is a performance Improvement to the existing Patriot Advanced Capability (PAC-3) missile. The MSE’s improved capability is achieved through a higher performance solid rocket motor, modified lethality enhancer, more responsive control surfaces, upgraded guidance software, and insensitive munitions improvements. The PAC-3 MSE employs kinetic energy to destroy targets through a hit-to-kill capability and provides the range, accuracy, and lethality to effectively intercept and destroy tactical ballistic missiles, air-breathing threats, cruise missiles, and unmanned aerial systems. This missile engages maneuvering and advanced threats earlier, expanding operational battlespace performance against complex threats. These improvements result in a more agile, lethal interceptor missile with enhanced Insensitive Munitions (IM) compliance. The PAC-3 MSE is the latest generation interceptor fired from the Patriot system.



Mission: Provide the Combatant Commanders with a hit-to-kill, surface-to-air missile that can intercept tactical ballistic missiles, cruise missiles, and air-breathing threats that have chemical, biological, radiological, nuclear, and conventional high explosive warheads. The MSE extends the PAC-3 range, filling a critical performance gap, and affords greater protection for deployed U.S. and allied forces.

FY 2020 Program: Funds the production of 147 Missile Segment Enhancement (MSE) missiles, as well as 41 Launcher Mod Kits (LMK), Field Surveillance Program (FSP), supporting equipment, ancillary missile items, PAC-3 Missile Support Center (P3MSC), Obsolescence, System Engineering/Program Management (SE/PM), and Government/Software Engineering.

Prime Contractor(s): Lockheed Martin Missiles and Fire Control; Dallas, TX

PAC-3/MSE										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	-	-	-	-	-	-	-	-	-	-
Procurement	1,103.0	368	1,131.3	280	-	-	736.5	147	736.5	147
Total	1,103.0	368	1,131.3	280	-	-	736.5	147	736.5	147

Numbers may not add due to rounding

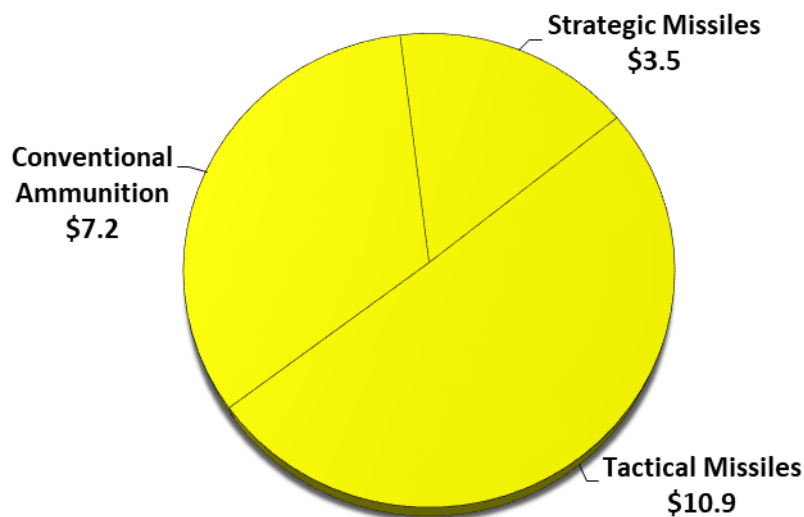
Missiles and Munitions

Munitions is a general term for ammunition and missiles. Ammunition consists of bombs, grenades, rockets, mines, projectiles, and other similar devices. There are conventional and nuclear missiles used for both tactical and strategic purposes. Many missiles are precision guided, with the technical sophistication to allow guidance corrections during flight-to-target. Some programs include non-explosive articles that enhance the performance of other munitions. For example, the Joint Direct Attack Munitions (JDAM) adds guidance capability when attached to a gravity bomb, making it a “smart” bomb.

In FY 2020, the Department continues to execute a balanced munitions procurement strategy in response to both current operations and advanced, long-term threats. The Department is increasing procurement of Small Diameter Bomb I, Guided Multi-Launch Rocket System, and Hellfire missiles, to ensure sufficiency for today’s warfighter, while expanding industrial capacity to meet increasing demands. In parallel, the Department continues to accelerate inventories of the next generation of standoff weapons for high value land attack targets such as the Joint Air-to-Surface Standoff Missile-Extended Range. Procurement of the Small Diameter Bomb II provides an all-weather capability against moving targets. The Long Range Anti-Ship Missile (LRASM) is the next generation of anti-ship cruise missile with the ability to engage heavily defended maritime targets at standoff ranges and increased survivability. Investment also continues in shipboard air defense missiles such as the Standard Missile-6 to enhance the ships survivability.

FY 2020 Missiles and Munitions Total: \$21.7 Billion

\$ in Billions

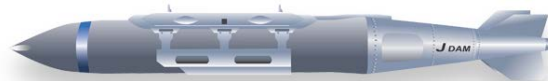


*Numbers may not add due to rounding
Numbers do not include Operation and Maintenance (O&M)*

Joint Direct Attack Munition

DOD - JOINT

The Joint Direct Attack Munition (JDAM) is a joint Air Force and Navy program led by the Air Force. The JDAM improves the existing inventory of general purpose gravity bombs by integrating a Global Positioning System (GPS)/inertial navigation guidance capability



USAF Image

that improves accuracy and adverse weather capability. A Laser JDAM (LJDAM) variant increases operational flexibility for an expanded target set. The laser sensor kit added to the JDAM weapon kit provides the ability to attack targets of opportunity, including land-moving and maritime targets, when designated by an airborne or ground laser.

Mission: Enhances DoD conventional strike system capabilities by providing the ability to precisely attack time-critical, high value fixed or maritime targets under adverse environmental conditions and from all altitudes.

FY 2020 Program: Continues full-rate production of the system. The factory will operate at the maximum rate of production.

Prime Contractor(s): The Boeing Company; St. Charles, MO

Joint Direct Attack Munition										
	FY 2018		FY 2019		FY 2020					
					Base Budget		OCO Budget		Total Request	
	\$M	Qty	\$M	Qty	\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	-	-	15.8	-	-	-	-	-	-	-
Procurement										
Air Force	985.1	35,106	922.6	36,000	-	-	1,066.2	37,000	1,066.2	37,000
Navy	164.2	7,758	180.9	7,594	-	-	82.7	3,388	82.7	3,388
Subtotal	1,149.3	42,864	1,103.5	43,594	-	-	1,148.9	40,388	1,148.9	40,388
Total	1,149.3	42,864	1,119.3	43,594	-	-	1,148.9	40,388	1,148.9	40,388

Numbers may not add due to rounding

Hellfire Missiles

DOD - JOINT

The Laser HELLFIRE II system family of air-to-ground missiles (all variants) provides attack helicopters and unmanned aircraft systems (UAS) with point-target precision strike capability to defeat heavy, advanced armor, individual hard point and non-traditional targets. HELLFIRE II missiles use a semi-active laser terminal guidance and are the primary armament of the AH-64 Apache, Army UAS and Special Operations aircraft. The HELLFIRE II AGM-114R is 64 inches in length and weighs 108 lbs. Weapons range is approximately 8 kilometers. The HELLFIRE II missile includes Electro-Optical Countermeasure capability, warhead improvements and an updated electronic fuse. The AGM-114R HELLFIRE II missile will be the single variant that replaces all other HELLFIRE II missile configurations (K/N/M/P).



Mission: Engages and defeats individual moving or stationary ground targets such as armor, mechanized, or vehicular targets, building, or bunkers.

FY 2020 Program: Continues at full-rate production. The factory will operate at the maximum rate of production.

Prime Contractor(s): Lockheed Martin; Orlando, FL

Hellfire Missiles										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
Procurement										
Army	433.0	5,233	193.7	2,309	-	-	429.6	5,112	429.6	5,112
Air Force	379.4	5,158	288.8	3,734	118.9	1,531	180.8	2,328	299.7	3,859
Navy	8.8	110	1.5	23	-	-	1.5	29	1.5	29
Total	821.2	10,501	484.0	6,066	118.9	1,531	611.9	7,469	730.8	9,000

Numbers may not add due to rounding

Small Diameter Bomb (SDB) I

DOD - JOINT

The Small Diameter Bomb Increment I (SDB I) is an Air Force program providing increased kills per sortie on current and future aircraft platforms. The SDB I is a conventional 250 lb. small sized, precision guided air-to-ground weapon that can be delivered from both fighter and bomber aircraft from standoff or Close Air Support. The SDB I is a fixed and stationary target attack weapon.



Mission: Destroys targets from a medium-range Standoff (<40nm) / GPS Anti-Jam or Close Air Support position deliverable by both fighter and bomber aircraft, with higher load-out and less collateral damage compared to other weapons.

FY 2020 Program: The factory will operate at the maximum rate of production.

Prime Contractor(s): Boeing Company; St. Charles, MO

Small Diameter Bomb I										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	-	-	-	-	-	-	-	-	-	-
Procurement	301.4	6,964	209.3	5,744	275.4	7,078	-	-	275.4	7,078
Total	301.4	6,964	209.3	5,744	275.4	7,078	-	-	275.4	7,078

Numbers may not add due to rounding

Small Diameter Bomb (SDB) II

DOD - JOINT

The Small Diameter Bomb (SDB) II is a joint Air Force and Navy program led by the Air Force to provide a conventional small sized, precision guided air-to-ground weapon that can be delivered from both fighter and bomber aircraft to attack mobile and fixed targets through adverse weather from standoff. The SDB II incorporates a tri-mode seeker and data link, which expands the use to moving targets.



USAF Image

Mission: Destroys targets from a medium-range standoff position deliverable by both fighter and bomber aircraft, with higher load-out and less collateral damage compared to other weapons.

FY 2020 Program: Completes fielding of SDB II on the F-15E and continues integration on the F/A-18E/F and F-35B/C. Continues development and integration of a military code GPS receiver and an enhanced cryptographic datalink. The factory will operate at the maximum rate of production.

Prime Contractor(s): Raytheon Missile Systems; Tucson, AZ

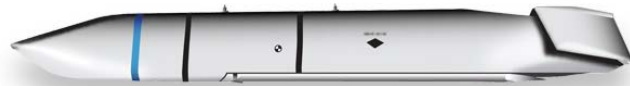
Small Diameter Bomb II										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E										
Air Force	37.7	-	78.1	-	31.2	-	-	-	31.2	-
Navy	99.3	-	97.0	-	50.1	-	-	-	50.1	-
Subtotal	137.0	-	175.1	-	81.3	-	-	-	81.3	-
Procurement										
Air Force	82.9	507	100.9	510	212.4	1,175	-	-	212.4	1,175
Navy	21.0	90	91.3	750	-	-	118.5	750	118.5	750
Subtotal	103.9	597	192.2	1,260	212.4	1,175	118.5	750	330.9	1,925
Total	240.9	597	367.3	1,260	293.7	1,175	118.5	750	412.2	1,925

Numbers may not add due to rounding

Joint Air-to-Surface Standoff Missile



The Joint Air-to-Surface Standoff Missile (JASSM) Baseline provides a survivable, precision cruise missile to kill hard, medium, and soft targets. It is a 2,000-pound class weapon with a multi-purpose, hardened blast frag penetrator warhead. The JASSM can cruise autonomously in adverse weather, day or night, to defeat high value targets even when protected by next generation defenses. The range for the baseline JASSM variant (AGM-158A) is greater than 200 nautical miles. The JASSM navigates to a pre-planned target using a Global Positioning System-aided Inertial Navigation System and transitions to automatic target correlation using an imaging infrared seeker in the terminal phase of flight. The JASSM is integrated on the F-15E, F-16, B-52, B-1, and B-2 aircraft. Procurement of JASSM Baseline concluded in FY 2016.



USAF Image

The JASSM-Extended Range (ER) increment has a more fuel-efficient engine, greater fuel capacity, and adds 2.5 times the standoff range at greater than 500nm. The JASSM-ER (AGM-158B) maintains the same outer mold line and low-observable properties as JASSM Baseline, but replaces the turbojet engine with a higher thrust, more fuel efficient turbofan engine (Williams International). The JASSM-ER is currently integrated on the F-15E, B-1 and B-52 aircraft with integration on the F-16, and B-2 aircraft by FY 2020.

Mission: Destroys high value targets from a long-range standoff position deliverable by fighter and bomber aircraft.

FY 2020 Program: Continues full-rate production of the system. The factory will operate at the maximum rate of production on the same production line as the Long Range Anti-Ship Missile.

Prime Contractor(s): Lockheed Martin Corporation; Troy, AL

Joint Air-to-Surface Standoff Missile										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	29.4	-	42.5	-	78.5	-	-	-	78.5	-
Procurement	433.1	360	602.8	360	482.5	411	20.9	19	503.4	430
Total	462.5	360	645.3	360	561.0	411	20.9	19	581.9	430

Numbers may not add due to rounding

Air Intercept Missile – 9X

DOD - JOINT

The Air Intercept Missile-9X (AIM-9X), also known as SIDEWINDER, is a short range air-to-air missile that provides launch-and-leave warfighting capability. The AIM-9X Block II is a fifth generation



USAF Image

infrared missile with a staring focal plane array imaging infrared (IR) seeker and high-angle off-boresight capability. It is mounted on a highly maneuverable (thrust vectored) airframe, along with digital guidance and IR signal processing that results in enhanced acquisition ranges, improved IR counter-countermeasures capability, and robust engagement zones for first shot/first kill air-to-air performance. The AIM-9X is a joint Navy/ Air Force program led by the Navy.

Mission: Destroys low and high altitude, high-speed enemy targets in an electronic countermeasures environment.

FY 2020 Program: Continues AIM-9X Block II full rate production while addressing obsolescence and future warfighting improvements.

Prime Contractor(s): Raytheon Missile Systems; Tucson, AZ

Air Intercept Missile – 9X										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E										
Air Force	36.3	-	37.2	-	10.3	-	-	-	10.3	-
Navy	34.1	-	40.1	-	19.5	-	-	-	19.5	-
Subtotal	70.4	-	77.3	-	29.8	-	-	-	29.8	-
Procurement										
Air Force	124.7	310	121.3	256	160.4	355	-	-	160.4	355
Navy	76.9	185	121.5	311	-	-	119.5	292	119.5	292
Subtotal	201.6	495	242.8	567	160.4	355	119.5	292	279.9	647
Total	272.0	495	320.1	567	190.2	355	119.5	292	309.7	647

Numbers may not add due to rounding

Advanced Medium Range Air-to-Air Missile

DOD - JOINT

The Advanced Medium Range Air-to-Air Missile (AMRAAM) is an all-weather, all-environment radar guided missile developed to improve capabilities against very low-altitude and high-altitude, high-speed targets in an electronic countermeasures environment. The AMRAAM is a joint Navy/Air Force program led by the Air Force.



USAF Image

Mission: Destroys low and high altitude, high-speed enemy targets in an electronic countermeasures environment. The AMRAAM is a fire-and-forget air-to-air missile, and has replaced the AIM-7 Sparrow as the U.S. military's standard beyond visual range intercept missile. The missile has undergone various service life improvements. The current generation, AIM-120D, has a two-way data link, Global Position System-enhanced Inertial Measurement Unit, an expanded no-escape envelope, improved high-angle off-boresight capability, and increased range over previous variants.

FY 2020 Program: Continues production as well as product improvements such as fuzing, guidance, and kinematics.

Prime Contractor(s): Raytheon Company; Tucson, AZ

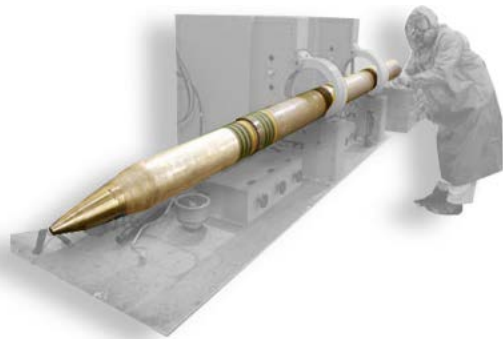
Advanced Medium Range Air-to-Air Missile										
	FY 2018		FY 2019		FY 2020					
	FY 2018 \$M	Qty	FY 2019 \$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E										
Air Force	51.4	-	57.3	-	55.4	-	-	-	55.4	-
Navy	29.5	-	28.2	-	39.0	-	-	-	39.0	-
Subtotal	80.9	-	85.5	-	94.4	-	-	-	94.4	-
Procurement										
Air Force	264.3	185	307.5	187	332.3	220	-	-	332.3	220
Navy	185.3	120	188.5	141	-	-	224.5	169	224.5	169
Subtotal	449.6	305	496.0	328	332.3	220	224.5	169	556.8	389
Total	530.5	305	581.5	328	426.7	220	224.5	169	651.2	389

Numbers may not add due to rounding

Chemical Demilitarization

DOD - JOINT

The Chemical Demilitarization Program (CDP) is composed of two Major Defense Acquisition Programs, which are the Assembled Chemical Weapons Alternatives (ACWA) Program and the U.S. Army Chemical Materials Activity, both with the goal of destroying a variety of United States chemical agents and weapons, including the destruction of former chemical weapon production facilities. The CDP is designed to eliminate the existing U.S. chemical weapons stockpile in compliance with the Chemical Weapons Convention signed in 1997 and the congressionally mandated destruction deadline of December 31, 2023 - while ensuring the safety and security of the workers, the public, and the environment.



US Army Photo

Mission: There are three mission areas within the Chemical Demilitarization Program:

1. Destroy the remaining 8.5 percent of the U.S. chemical weapons stockpile at the ACWA Program sites (Colorado and Kentucky).
2. Continue the Chemical Stockpile Emergency Preparedness Project (CSEPP) including emergency response planning.
3. Support the Recovered Chemical Warfare Material (RCWM) Program within the United States, which provides technical expertise, project management and maintains crews and equipment required for the assessment and destruction of RCWM.

FY 2020 Program: Funds the ACWA Program, complete systemization and start destruction operations at Kentucky while continuing destruction operations at Colorado. Continues the CSEPP efforts and the emergency response planning at Colorado and Kentucky. Sustains the crews, equipment, and management structure required to ensure that the Department of Defense retains emergency response capability to assess and destroy the RCWM in the United States.

Prime Contractor(s): Bechtel National Incorporated; Pueblo, CO
Bechtel Parsons, Joint Venture; Richmond, KY

Chemical Demilitarization										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
Chemical Agents and Munitions Destruction	961.7	-	993.8	-	985.5	-	-	-	985.5	-
Total	961.7	-	993.8	-	985.5	-	-	-	985.5	-

Numbers may not add due to rounding

Joint Air-to-Ground Missile

DOD - JOINT

The Joint Air-to-Ground Missile (JAGM) provides an improved air-to-ground missile capability for Rotary Wing aircraft and Unmanned Aircraft Systems. The JAGM is an aviation launched, precision guided munition for use against high value stationary, moving, and relocatable land and naval targets. It is different than the Hellfire missile in that it utilizes a multi-mode seeker to provide precision point and fire-and-forget targeting day or night in adverse weather, battlefield obscured conditions, and against a variety of countermeasures. A multi-purpose warhead provides lethal effects against a range of target types, from armored vehicles, thin-skinned vehicles and maritime patrol craft, to urban structures and field fortifications. The JAGM delivers the Joint services a single air-to-ground missile with improved lethality, operational flexibility, and a reduced logistics footprint.



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Mission: Engages and defeats high value stationary, moving, and relocatable land and naval targets with precision point and fire-and-forget targeting day or night, in adverse weather, battlefield obscured conditions, and against a variety of countermeasures.

FY 2020 Program: Full Rate Production decision is scheduled for 3rd quarter in FY 2020.

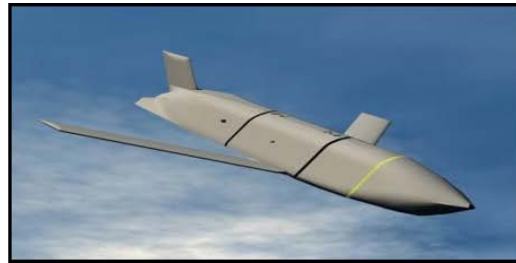
Prime Contractor(s): Lockheed Martin; Orlando, FL

Joint Air-to-Ground Missile (JAGM)										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E										
Army	28.5	-	11.8	-	9.5	-	-	-	9.5	-
Navy	14.5	-	16.6	-	18.4	-	-	-	18.4	-
Subtotal	43.0	-	28.4	-	27.9	-	-	-	27.9	-
Procurement										
Army	178.4	899	256.5	721	-	-	233.4	609	233.4	609
Navy	3.8	-	24.1	75	-	-	91.0	382	91.0	382
Air Force	-	-	-	-	15.0	60	-	-	15.0	60
Subtotal	182.2	899	280.6	796	15.0	60	324.4	991	339.4	1,051
Total	225.2	899	309.0	796	42.9	60	324.4	991	367.3	1,051

Numbers may not add due to rounding

Long Range Anti-Ship Missile (LRASM)

DOD - JOINT



The Long Range Anti-Ship Missile (LRASM) is an accelerated acquisition program designed to address the Offensive Anti-Ship Warfare (OASuW)/Increment 1 requirement. LRASM is a precision guided anti-ship missile with semi-autonomous guidance, day/night and all-weather capability which integrates a multi-modal sensor suite, a weapons data-link, enhanced digital anti-jam Global Positioning System capabilities and a 1,000 lb penetrator/blast fragmentation warhead. LRASM provides Combatant Commanders the ability to conduct anti-surface warfare operations against high-value surface combatants protected by Integrated Air Defense System with long-range surface-to-air missiles and deny adversaries the sanctuary of maneuver. LRASM has completed transition from Defense Advanced Research Projects Agency to Navy leadership. LRASM achieved its Early Operational Capability (EOC) on Air Force B-1 bombers in December 2018 at 10 months ahead of the schedule. LRASM will be fielded on Navy F/A-18E/F aircraft by the end of FY 2019. The LRASM is a joint Navy/Air Force program led by Navy.

Mission: Provide robust anti-surface warfare capability to ensure freedom of maneuver, maintain sea lines-of-communication, and extend joint warfighter combat reach in contested maritime environments.

FY 2020 Program: Continue production, integration, and test phase of the air-launched LRASM program in support of the F/A-18E/F. The factory will operate at the maximum rate of production on the same production line as the Joint Air-to-Surface Standoff Missile (JASSM).

Prime Contractor(s): Lockheed Martin Corporation; Troy, AL

Long Range Anti-Ship Missile (LRASM)										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	163.8	-	139.3	-	65.4	-	-	-	65.4	-
Procurement										
Navy	107.7	34	111.2	35	-	-	143.2	48	143.2	48
Air Force	61.7	16	54.4	15	-	-	-	-	-	-
Subtotal	169.4	50	165.6	50	-	-	143.2	48	143.2	48
Total	333.2	50	304.9	50	65.4	-	143.2	48	208.6	48

Numbers may not add due to rounding

Guided Multiple Launch Rocket System

USA

The Guided Multiple Launch Rocket System (GMLRS) is a surface-to-surface artillery missile fired from the M142 High Mobility Artillery Rocket System (HIMARS) and the M270A1 Multiple Launch Rocket System (MLRS) launchers. It provides a responsive, all-weather, rapidly-deployable precision strike capability. The GMLRS uses an on-board Inertial Measurement Unit (IMU) in combination with a



Global Positioning System (GPS) guidance set to provide a high level of accuracy and effects against a variety of target sets. The GMLRS program consists of three separate increments, all with a range of 15-70+ kilometers. The M30 GMLRS Dual Purpose Improved Conventional Munition (DPICM) missile was the first increment. It has a cluster munition (CM) warhead and replaced the shorter range M26/M26A2 MLRS rockets used to engage area or imprecisely located targets. GMLRS DPICM production was terminated in response to the June 2008 Department of Defense (DoD) Policy on CM and Unintended Harm to Civilians. The M31/M31A1 GMLRS Unitary is the second increment that can engage precisely located point targets utilizing a single 200-pound low collateral damage high-explosive warhead. The third increment, the M30A1 GMLRS Alternative Warhead (AW), was developed as a non-cluster munition used to engage area and imprecisely located targets. The GMLRS AW and Unitary variants are in compliance with the requirements outlined in the November 2017 update to DoD Policy on CM.

Mission: Neutralizes or suppresses enemy field artillery and air defense systems and complements cannon artillery fires.

FY 2020 Program: Continues at full rate production of GMLRS (AW/Unitary) as well as product improvements such as insensitive munition propulsion. The factory will operate at the maximum rate of production.

Prime Contractor(s): Lockheed Martin Corporation; Dallas, TX and Camden, AR

Guided Multiple Launch Rocket System										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	93.9	-	119.0	-	138.6	-	-	-	138.6	-
Procurement										
Army	1,027.9	6,528	975.5	7,818	-	-	1,228.8	9,853	1,228.8	9,853
Navy	59.1	408	29.5	283	29.1	210	16.9	130	46.0	340
Subtotal	1,087.0	6,936	1,005.0	8,101	29.1	210	1,245.7	9,983	1,274.8	10,193
Total	1,180.9	6,936	1,124.0	8,101	167.7	210	1,245.7	9,983	1,413.4	10,193

Numbers may not add due to rounding

Javelin Advanced Anti-Tank Weapon System - Medium



The Javelin is highly effective against a variety of targets at extended ranges under day/night, battlefield obscurants, adverse weather, and multiple counter-measure conditions. The system’s soft-launch feature permits firing from enclosures commonly found in complex urban terrain. The system consists of a reusable command launch unit (CLU) and a modular missile encased in a disposable launch tube assembly. The CLU provides stand-alone all-weather and day/night surveillance capability. Javelin provides precision effects in either a top-attack or direct-attack mode to defeat armored vehicles, fortifications and soft targets in full spectrum operations. It uses an imaging infrared two-dimensional staring focal plane array seeker and a tandem warhead with two shaped charges; a precursor warhead to defeat reactive armor, and a primary warhead to penetrate base armor and other structures. It is effective against stationary and moving targets.



USMC Photo

Mission: Provides the dismounted soldier with the only man-portable, fire-and-forget system that is highly lethal against targets ranging from main battle tanks to fleeting targets of opportunity found in current threat environments.

FY 2020 Program: Continues procurement of FGM-148F (F model) Javelin missiles with a Multi-Purpose Warhead, which improves lethality against exposed personnel. Continues development of a lightweight CLU to reduce soldier burden and bulk.

Prime Contractor(s): Raytheon Missile Systems/Lockheed Martin Javelin Joint Venture
Tucson, AZ and Orlando, FL

Javelin Advanced Anti-Tank Weapon System - Medium										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	20.3	-	5.6	-	17.9	-	-	-	17.9	-
Procurement										
Army	265.5	955	245.5	1,337	-	-	142.8	697	142.8	697
Navy	37.5	233	3.0	5	20.2	97	-	-	20.2	97
Subtotal	303.0	1,188	248.5	1,342	20.2	97	142.8	697	163.0	794
Total	323.3	1,188	254.1	1,342	38.1	97	142.8	697	180.9	794

Numbers may not add due to rounding

Trident II Ballistic Missile Modifications



The Trident II (D5) is a submarine launched ballistic missile. It provides the most survivable, second-strike capability in our nation's nuclear Triad. The Trident II missile is carried on the OHIO-class Fleet Ballistic Missile Submarine. The ongoing Life Extension Program (LEP) ensures viability of a highly survivable strategic deterrent through 2042, providing the ability to precisely attack time-critical, high value, fixed targets. The LEP includes the procurement of missile electronic and guidance Supportability Mods/Strategic Programs Alteration (SPALT) kits. The importance of this program as a key component to the sea-based leg of the nuclear triad was re-confirmed by the President and Congress with the ratification of the New START Treaty in 2011.



US Navy Photo

Mission: Aboard a virtually undetectable platform, the submarine launched fleet ballistic missile deters nuclear war by means of assured second-strike capability in response to a major attack on the United States or its allies.

FY 2020 Program: FY 2020 funding supports the production of the redesigned guidance system and missile electronics packages, which must be replaced to support the extended service life of the Ohio Class Submarines. Funds also support procurement of Trident II D5 missile LEP, to include missile motors, guidance, fuzing, arming and firing systems, and other critical components.

Prime Contractor(s): Lockheed Martin Corporation; Sunnyvale, CA

Trident II Ballistic Missile Modifications										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	126.4	-	62.0	-	23.3	-	-	-	23.3	-
Procurement	1,143.6	-	1,057.0	-	-	-	1,177.3	-	1,177.3	-
Total	1,270.0	-	1,119.0	-	23.3	-	1,177.3	-	1,200.6	-

Numbers may not add due to rounding

Standard Missile-6



The Standard Missile-6 (SM-6) is a surface Navy Anti-Air Warfare (AAW) missile that provides area and ship self-defense. The missile is intended to project power and contribute to raid annihilation by destroying manned fixed and rotary wing aircraft, Unmanned Aerial Vehicles



US Navy Photo

(UAV), Land Attack Cruise Missiles (LACM), and Anti-Ship Cruise Missiles (ASCM) in flight. It was designed to fulfill the need for a vertically launched, extended range missile compatible with the Aegis Weapon System (AWS) to be used against extended range threats at-sea, near land, and overland. The SM-6 combines the tested legacy of STANDARD Missile-2 (SM-2) propulsion and ordnance with an active Radio Frequency (RF) seeker modified from the AIM-120 Advanced Medium Range Air-to-Air Missile (AMRAAM), allowing for over-the-horizon engagements, enhanced capability at extended ranges, and increased firepower.

Mission: Provides all-weather, anti-aircraft armament for cruisers and destroyers. The most recent variant of Standard Missile is SM-6, which incorporates an AMRAAM seeker for increased performance, including overland capability.

FY 2020 Program: Continues a five-year multiyear procurement (MYP) contract (FY 2019 – FY 2023), which continues production of the SM-6 variant. The factory will operate at the maximum production rate.

Prime Contractor(s): Raytheon Missile Systems; Tucson, AZ

Standard Missile-6										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	90.5	-	80.8	-	149.9	-	-	-	149.9	-
Procurement	491.3	125	615.9	125	-	-	500.6	125	500.6	125
Total	581.8	125	696.7	125	149.9	-	500.6	125	650.5	125

Numbers may not add due to rounding

Rolling Airframe Missile



The Rolling Airframe Missile (RAM) is a high firepower, lightweight complementary self-defense system to engage anti-ship cruise missiles. The systems design is based upon the infra-red seeker of the Stinger (FIM-92) missile, and the warhead, rocket motor, and fuse from the Sidewinder (AIM-9) missile. The missile uses Radio Frequency (RF) for midcourse guidance, and transitions to Infrared (IR) guidance for terminal engagement. The current RM-116 configuration is Block II (RIM-116C).



Mission: Provides high firepower close-in defense of combatant and auxiliary ships by utilizing a dual mode, passive radio frequency/infrared missile in a compact 21 missile launcher.

FY 2020 Program: Continues Full Rate Production (FRP) for the Block II (RIM-116C) missile.

Prime Contractor(s): Raytheon Missile Systems; Tucson, AZ

Rolling Airframe Missile										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	39.6	-	26.3	-	22.0	-	-	-	22.0	-
Procurement	106.6	120	96.2	108	-	-	106.8	120	106.8	120
Total	146.2	120	122.5	108	22.0	-	106.8	120	128.8	120

Numbers may not add due to rounding

Tactical Tomahawk Cruise Missile



Tomahawk is a long range cruise missile used for deep land-attack strike warfare that is launched from U.S. Navy surface combatants and submarines. Tomahawk Block IV features an improved navigation/guidance computer; robust anti-jam Global Positioning System (GPS) capabilities; increased responsiveness and flexibility via satellite communications for in-flight re-targeting; a loiter capability; and the ability to transmit a Battle Damage Indication (BDI) prior to impact. Block IV Tomahawk delivers a 1,000 lb class unitary warhead at a range of 900 nm. Block IV Tomahawk employs inertial guidance or GPS over water to follow a preset course; once over land, the missile's guidance system is aided by Terrain Contour Matching (TERCOM). Terminal guidance is provided by the Digital Scene Matching Area Correlation (DSMAC) system or GPS, enabling highly accurate precision attack.



US Navy Photo

Block IV Tomahawk delivers a 1,000 lb class unitary warhead at a range of 900 nm. Block IV Tomahawk employs inertial guidance or GPS over water to follow a preset course; once over land, the missile's guidance system is aided by Terrain Contour Matching (TERCOM). Terminal guidance is provided by the Digital Scene Matching Area Correlation (DSMAC) system or GPS, enabling highly accurate precision attack.

Mission: Provides precision strike against long and medium range tactical targets.

FY 2020 Program: Continues production of Tomahawk Block IV missiles and prepares for mid-life recertification. Funds the development of a maritime strike variant to engage surface targets.

Prime Contractor(s): Raytheon Missile Systems; Tucson, AZ

Tactical Tomahawk Cruise Missile										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
Procurement	303.0	100	98.6	-	386.7	90	-	-	386.7	90
RDT&E	100.0	-	252.4	-	320.1	-	-	-	320.1	-
Total	403.0	100	351.0	-	706.9	90	-	-	706.9	90

Numbers may not add due to rounding

Ground Based Strategic Deterrent (GBSD)



The Ground Based Strategic Deterrent (GBSD) program is the Air Force effort to replace the aging LGM-30 Minuteman III intercontinental ballistic missile (ICBM). The Minuteman III missile fleet was fielded in the 1970s with an initial 10-year service life, while its launch and command and control systems date back to the 1960s. The new GBSD weapon system will meet existing user requirements, while having the adaptability and flexibility to affordably address changing technology and threat environments through 2075. Deployment is projected to begin in the late 2020s.



Mission: As a critical part of the nuclear triad, ICBMs provide land-based strategic nuclear deterrence, assurance, and stability by providing a responsive and resilient capability that assures allies they do not need to expand their own capability, dissuade proliferation, deter adversaries, and, should deterrence fail, decisively defeat adversary targets and retaliatory capabilities as authorized and directed by the President. The GBSD will continue to maintain strategic stability at a reasonable cost, while hedging against potential problems or vulnerabilities in other portions of the triad.

FY 2020 Program: Funds technology maturation and risk reduction activities to deliver mature and integrated technologically to support the preliminary design of the weapon system.

Prime Contractor(s): The Boeing Company; Huntsville, AL
Northrop Grumman Corporation; El Segundo, CA

Ground Based Strategic Deterrent (GBSD)										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	221.5	-	414.4	-	570.4	-	-	-	570.4	-
Procurement	-	-	-	-	-	-	-	-	-	-
Total	221.5	-	414.4	-	570.4	-	-	-	570.4	-

Numbers may not add due to rounding

B61 Tail Kit Assembly (TKA)



The B61 is a nuclear gravity bomb developed by the Department of Energy’s National Nuclear Security Administration (DOE/NNSA) for the Department of Defense. Current versions in the inventory were fielded between 1978 and 1990 and require component refurbishment and replacement to maintain a safe, secure and effective capability.



Mission: Provide the strategic weapons for the airborne leg of the nuclear triad and are carried on the B-52, the B-2, and NATO dual-use aircraft today. The new variant consolidates four versions and will be carried by the B-2 and North Atlantic Treaty Organization (NATO) aircraft as well as the F-35 and the B-21 bomber. To extend the life of this weapon, DOE/NNSA and the Air Force are jointly implementing a Life Extension Program (LEP) to refurbish the B61 with a First Production Unit in 2020. The Air Force portion of the LEP is to provide the development, acquisition and delivery of a guided tail kit assembly and all up round technical integration, system qualification and fielding of the B61-12 variant.

FY 2020 Program: Met Milestone C in October 2019. Continues software development and integration for the F-15E, F-16, and B-2 aircraft, and begins PA-200 integration. Continues to fund development, design, test, integration, qualification, and nuclear certification activities in support of the B61-12 LEP through Phase II of engineering and manufacturing development. Funds Initial Operational Test and Evaluation. Funds low-rate initial production of TKAs and advance procurement of long-lead items for full-rate production.

Prime Contractor(s): The Boeing Company; St. Charles, MO

B61 Tail Kit Assembly (TKA)										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	81.6	-	81.6	-	27.6	-	-	-	27.6	-
Procurement	74.9	15	152.2	250	-	-	80.8	533	80.8	533
Total	156.5	15	233.8	250	27.6	-	80.8	533	108.4	533

Numbers may not add due to rounding

Long Range Stand-Off (LRSO) Weapon

USAF

Long Range Stand-Off (LRSO) Weapon is a nuclear cruise missile capable of penetrating and surviving complex advanced integrated air defense systems and GPS-denied environments from significant standoff ranges. The LRSO replaces the Air Launched Cruise Missile (ALCM) which entered service in 1982 and is well past its original 10-year design service life. LRSO details are classified to protect critical program information.



Mission: The Long Range Stand Off cruise missile retains penetrating and survivable capabilities in advanced Integrated Air Defense Systems and GPS-denied environments from significant standoff ranges, ensuring we maintain a credible deterrent. Combined with nuclear capable bombers, LRSO provides the nuclear triad with a clear, visible, and tailorable deterrent to provide the President and U.S. Forces the ability to project power and hold at risk any target at any location on the globe. LRSO provides a hedge against future technological and geopolitical uncertainties. LRSO provides a reliable cost-effective force multiplier for the B-52 and the B-21 bomber.

FY 2020 Program: Funds the development, design, and planning for test, integration, qualification and nuclear certification activities. It continues funding for the Technology Maturation Risk Reduction (TMRR) efforts to include design reviews, warhead and aircraft integration. The next major milestone after TMRR award is Milestone B decision with an Engineering Manufacturing and Development contract award planned for FY 2022.

Prime Contractor(s): Lockheed Martin Corporation; Orlando, FL
Raytheon Company; Tucson, AZ

Long Range Stand-Off (LRSO) Weapon										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	437.5	-	664.9	-	712.5	-	-	-	712.5	-
Procurement	-	-	-	-	-	-	-	-	-	-
Total	437.5	-	664.9	-	712.5	-	-	-	712.5	-

Numbers may not add due to rounding

Shipbuilding and Maritime Systems

A central principle to the United States Maritime Strategy is forward presence, which promotes conflict deterrence by ensuring forces are in a position to expeditiously respond to conflict. Therefore, sea services must procure, build, and maintain maritime systems in accordance with mission need.

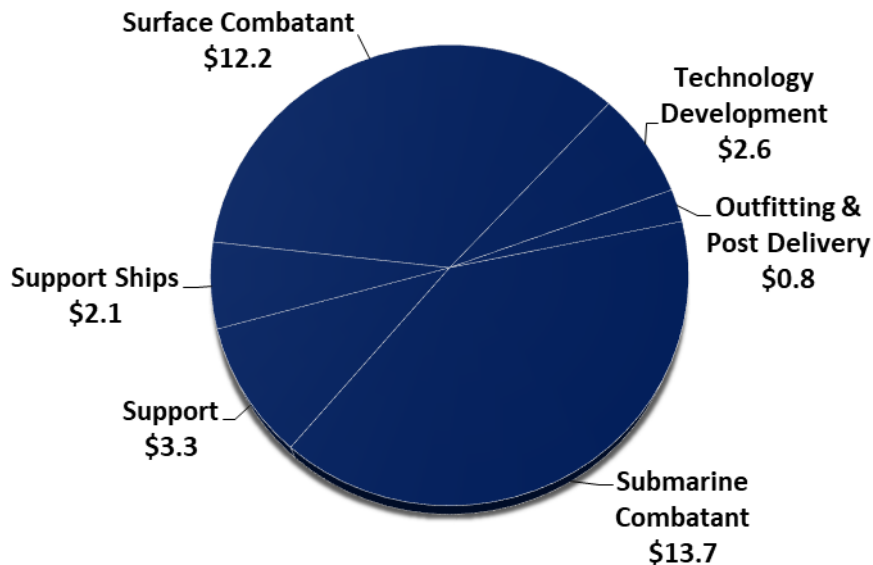
Consistent with the National Defense Strategy's (NDS) line of effort, "Build a More Lethal Force", the Navy's shipbuilding plan for the Future Years Defense Program (FYDP) provides for the construction of 55 Battle Force Ships along with 10 large futuristic Unmanned Surface Vehicles (USV) (*note: USV are not considered to be elements of the battle force ship count*).

The funding in this category finances the developmental efforts, the equipment procurements, and the construction of ships that will allow the U.S. Navy to maintain maritime dominance and superiority well into the 21st century.

The FY 2020 Shipbuilding Portfolio includes funding for the construction and service life extension of 19 vessels. Fourteen ships will begin construction of which twelve ships are part of the battle force fleet: 3 SSN 774 *Virginia* Class nuclear attack submarines, two of which are equipped with the Virginia Payload Module; 3 DDG 51 *Arleigh Burke* Class destroyers; 1 Frigate; 2 Fleet Replenishment Oilers; 2 Towing, Salvage and Rescue Ship (T-ATS); and 1 aircraft carrier (CVN 81); Two ships are Unmanned Surface Vehicles. The four support vessels are Landing Craft, Utility vessels. The one service life extension is the Refueling and Complex Overhaul for USS *Stennis* (CVN 74). In addition, the FY 2020 request includes funding for Advance Procurement to support detail design activities and long lead items for the *Columbia* Class Fleet Ballistic Missile Submarine (SSBN).

FY 2020 Shipbuilding and Maritime Systems Total: \$34.7 Billion

\$ in Billions



Numbers may not add due to rounding

CVN 78 *Gerald R. Ford* Class Nuclear Aircraft Carrier



Aircraft carriers are the centerpiece of U.S. Naval forces. The CVN 78 class ships include new technologies and improvements to improve efficiency and operating costs as well as reduced crew requirements. This new class brings improved warfighting capability, quality-of-life improvements for Sailors, and reduced total ownership costs. USS *Gerald R. Ford* is the first aircraft carrier designed with all electric utilities, eliminating steam service lines from the ship, reducing maintenance requirements and improving corrosion control. The new A1B reactor, Electromagnetic Aircraft Launch System (EMALS), Advanced Arresting Gear (AAG) and Dual Band Radar (DBR) all offer enhanced capability with reduced manning. The ship's systems and configuration are optimized to maximize the sortie generation rate (SGR) of attached strike aircraft.



Mission: Provides the United States with the core capabilities for forward presence, deterrence, sea control, power projection, maritime security and humanitarian assistance. The *Gerald R. Ford* class will be the premier forward asset for crisis response and early decisive striking power in a major combat operation.

FY 2020 Program: Funds construction of two carriers: USS *Enterprise* (CVN 80) and CVN 81 as part of a two-carrier procurement strategy which will result in \$4 billion in savings. Additional funding includes outfitting, training equipment, and continued development of ship systems continue.

Prime Contractor(s): Huntington Ingalls Industries; Newport News, VA

CVN 78 <i>Gerald R. Ford</i> Class Nuclear Aircraft Carrier										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	135.0	-	133.2	-	163.9	-	-	-	163.9	-
Procurement	4,219.9	1	1,615.0	-	2,442.8	1	-	-	2,442.8	1
Total	4,355.0	1	1,748.3	-	2,606.7	1	-	-	2,606.7	1

Numbers may not add due to rounding

Columbia Class Ballistic Missile Submarine Program



The *Columbia* Class Ballistic Missile Submarine is designed to replace the current *Ohio* class of Fleet Ballistic Missile Submarine (SSBN). The USS *Columbia* program will deliver 12 SSBNs with the necessary capability and capacity to meet the sea based strategic deterrence mission beyond retirement of the current submarine force and with sufficient mission capability to counter credible threats through 2080.



Artist conception courtesy of the U.S. Navy

Construction begins in FY 2021 for FY 2028 delivery when the first *Ohio* class ships begin decommissioning. The nuclear propulsion systems will be acquired from the nuclear industrial base under the direction of Naval Reactors. The program includes the development and construction of a Common Missile Compartment (CMC) capable of hosting the existing TRIDENT II missile system, which is conducted jointly with the United Kingdom to support the *Dreadnought* class SSBN.

Mission: Provides a sea-based strategic nuclear force. Maintains an appropriate state of readiness to assist in deterring nuclear attack on the United States and its allies. Launches missiles against targets should deterrence fail. Performs extended strategic deterrent patrols without requiring assistance or replenishment.

FY 2020 Program: Funds advance procurement for long-lead items, detail design, and research and development of nuclear technologies and ship systems such as the propulsion system, combat systems technology, and the common missile compartment. Funding also supports continuous production of missile tubes, Economic Order Quantity for multi-program procurement, continuous production of shipyard manufactured items, and supplier development.

Prime Contractor(s): General Dynamics; Groton, CT

Columbia Class Ballistic Missile Submarine Program										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	1,041.1	-	732.9	-	533.1	-	-	-	533.1	-
Procurement	861.9	-	3,173.4	-	1,698.9	-	-	-	1,698.9	-
Total	1,902.9	-	3,906.3	-	2,232.0	-	-	-	2,232.0	-

Numbers may not add due to rounding

SSN 774 Virginia Class Submarine



The Virginia Class Submarine is a multi-mission nuclear-powered attack submarine that provides the Navy with the capabilities to maintain undersea supremacy in the 21st century. Characterized by advanced stealth and enhanced features for Special Operations Forces, this submarine is able to operate in deep water and littoral environments. Equipped with vertical launchers and torpedo tubes, the submarine is able to launch Tomahawk cruise missiles as well as heavyweight torpedoes. In FY 2019, a contract was awarded for the Block V variants that will incorporate Acoustic Superiority and the Virginia Payload Module, which is an 84-foot hull section with four additional payload tubes, each capable of carrying seven Tomahawk cruise missiles or various other payloads.



US Navy Photo

Mission: Seeks and destroys enemy ships and submarines across a wide spectrum of scenarios, working independently and in concert with a battle group, separate ships, and independent units. Provides theater commanders with time sensitive critical information for accurate knowledge of the battlefield.

FY 2020 Program: Funds three ships in the second year of multiyear procurement (MYP) contract from FY 2019 to FY 2023, Economic Order Quantity (EOQ), advance procurement for four ships in future years, and outfitting and support equipment. Continues funding the development of the Virginia Payload Module, technology, prototype components, and systems engineering required for design and construction. Two hulls will include the Virginia Payload Module.

Prime Contractor(s): General Dynamics Corporation; Groton, CT
Huntington Ingalls Industries; Newport News, VA

SSN 774 Virginia Class Submarine										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	185.8	-	177.6	-	117.9	-	-	-	117.9	-
Procurement	5,559.2	2	7,250.5	2	10,100.4	3	-	-	10,100.4	3
Total	5,745.0	2	7,428.1	2	10,218.3	3	-	-	10,218.3	3

Numbers may not add due to rounding

DDG 51 Arleigh Burke Class Destroyer



The DDG 51 class guided missile destroyers provide a wide range of war fighting capabilities in multi-threat air, surface, and subsurface environments. The DDG 51 class ship is armed with a vertical launching system, which accommodates 96 missiles, and a 5-inch gun that provides Naval Surface Fire Support to forces ashore and anti-ship gunnery capability against other ships. This is the first class of destroyers with a ballistic missile defense capability. The Arleigh Burke class is comprised of four separate variants; DDG 51-71 represent the original design, designated Flight I ships, and are being modernized to current capability standards; DDG 72-78 are Flight II ships; DDG 79-124 and DDG 127 ships are Flight IIA ships; DDG 125, DDG 126, and DDG 128-140 will be constructed as Flight III ships with the Air and Missile Defense Radar (AMDR) capability.



US Navy Photo

Mission: Provides multi-mission offensive and defensive capabilities and can operate as part of a carrier strike group or independently. Conducts Anti-Air Warfare, Anti-Submarine Warfare, and Anti-Surface Warfare.

FY 2020 Program: Funds three Flight III DDG 51 class destroyers as part of a multiyear procurement (MYP) contract for ten ships from FY 2018 – FY 2022 (with potential options for additional ships), outfitting costs, and continued development of ship systems.

Prime Contractor(s): General Dynamics Corporation; Bath, ME
Huntington Ingalls Industries; Pascagoula, MS

DDG 51 Arleigh Burke Class Destroyer										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	250.4	-	205.9	-	280.7	-	-	-	280.7	-
Procurement	3,564.4	2	6,018.8	3	5,473.0	3	-	-	5,473.0	3
Total	3,814.8	2	6,224.6	3	5,753.8	3	-	-	5,753.8	3

Numbers may not add due to rounding

FFG(X) Guided Missile Frigate



The Guided Missile Frigate (FFG(X)) is a lethal and survivable multi-mission small surface combatant. With FFG(X), the Navy desires to maximize the small surface combatant survivability and capabilities in the anti-surface warfare, anti-submarine warfare, electromagnetic maneuver warfare, air warfare mission areas, while keeping the ship affordable as a part of a "high-low" mix of surface ships. The FFG(X) will form into strike groups and Large Surface Combatant action groups while maintaining the ability to operate independently. The FFG(X) program will continue to refine the cost estimates to support a FY 2020 Detail Design and Construction (DD&C) contract award.



Mission: Provides the Fleet with escort mission capabilities, performs naval-presence missions and conducts offensive operations.

FY 2020 Program: Funds Detail Design and Construction of one Frigate.

Prime Contractor(s): TBD

FFG(X) Guided Missile Frigate										
	FY 2018		FY 2019		FY 2020					
					Base Budget		OCO Budget		Total Request	
	\$M	Qty	\$M	Qty	\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	137.7	-	-	-	59.0	-	-	-	59.0	-
Procurement	-	-	-	-	1,281.2	1	-	-	1,281.2	1
Total	137.7	-	-	-	1,340.2	1	-	-	1,340.2	1

Numbers may not add due to rounding

CVN Refueling Complex Overhaul



The CVN Refueling Complex Overhaul (RCOH) life extension program provides for the modernization of nuclear powered fleet aircraft carriers. During the RCOH, the nuclear fuel is replaced and major system modernization activities are implemented to extend the useful operational life of the ship. An RCOH is performed midway through the ship's lifespan, which, for Nimitz class carriers, is approximately 25 years, and can take four years to complete.



Photo Courtesy of Northrop Grumman

Mission: Refuel and upgrade the Nimitz class aircraft carriers at mid-life to ensure reliable operations during the remaining ship life.

FY 2020 Program: Funds first year of incremental funding for refueling and modernization efforts for USS John C. Stennis (CVN 74).

Prime Contractor(s): Huntington Ingalls Industries; Newport News, VA

CVN Refueling Complex Overhaul										
	FY 2018		FY 2019		FY 2020					
					Base Budget		OCO Budget		Total Request	
	\$M	Qty	\$M	Qty	\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	-	-	-	-	-	-	-	-	-	-
Procurement	1,645.6	-	425.9	-	647.9	1	-	-	647.9	1
Total	1,645.6	-	425.9	-	647.9	1	-	-	647.9	1

Numbers may not add due to rounding

John Lewis Class Fleet Replenishment Oiler



The Fleet Replenishment Oiler (T-AO) program will build a new class of fleet oilers for the Navy. The lead ship in the class is USNS John Lewis (T-AO 205). The T-AO provides fuel and cargo delivery to support fleet operations. As compared to the previous class of oilers, this class has increased space for dry cargo and a helicopter refueling capability. The John Lewis class are built with a double-hull to guard against oil spills and to comply with international agreements concerning pollution from ships.



Mission: Transfers fuel and lubricants to Navy surface ships operating at sea to extend at-sea time for the ships and embarked aircraft.

FY 2020 Program: Funds construction of two fleet oilers, continued development of ship systems, outfitting costs and cost-to-complete for prior year ships.

Prime Contractor(s): General Dynamics, National Steel and Shipbuilding Co.; San Diego, CA

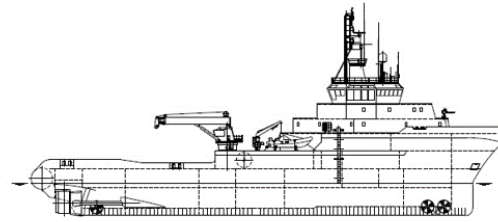
John Lewis Class Fleet Replenishment Oiler										
	FY 2018		FY 2019		FY 2020					
					Base Budget		OCO Budget		Total Request	
	\$M	Qty	\$M	Qty	\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	1.9	-	1.3	-	1.7	-	-	-	1.7	-
Procurement	533.1	1	1,085.3	2	1,079.6	2	-	-	1,079.6	2
Total	535.0	1	1,086.6	2	1,081.3	2	-	-	1,081.3	2

Numbers may not add due to rounding

T-ATS Towing, Salvage, and Rescue Ship



The T-ATS is a new class of towing, salvage, and rescue ship that will replace the Navy's current Fleet Ocean Tugs (T-ATF) and Rescue and Salvage Ships (T-ARS). Still in the design phase, the new T-ATS will recapitalize the existing T-ATF and T-ARS fleet with a common hull that will be capable of performing the existing missions. The current *Powhatan* class of Fleet tugs are used to tow ships, barges and targets for gunnery exercises. They are also used as platforms for salvage and diving work, as participants in naval exercises, to conduct search and rescue missions, to aid in the cleanup of oil spills and ocean accidents, and to provide firefighting assistance. Delivered in 1981, USNS Apache (T-ATF 172) is the last of the *Powhatan* class of ocean tugs. The current Safeguard class of Rescue and Salvage ships have a four-fold mission: to debeach stranded vessels, provide heavy lift capability from ocean depths, to tow other vessels, and provide manned diving operations. For rescue missions, these ships are equipped with fire monitors which can deliver either firefighting foam or sea water. The salvage holds of these ships are outfitted to provide assistance to other vessels in dewatering, patching, supply of electrical power and other essential service required to return a disabled ship to an operating condition. Delivered in 1986, USNS Salvor (T-ARS 52) is the last of the Safeguard class.



Artist conception courtesy of the US Navy

Mission: Supports a diverse set of missions including submarine rescue, deep ocean search and recovery, and expeditionary diving.

FY 2020 Program: Funds construction of two Towing, Salvage, and Rescue Ships.

Prime Contractor(s): Gulf Island Shipyard; Houma, LA

T-ATS Towing, Salvage, and Rescue Ship										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	-	-	-	-	-	-	-	-	-	-
Procurement	76.2	1	80.5	1	150.3	2	-	-	150.3	2
Total	76.2	1	80.5	1	150.3	2	-	-	150.3	2

Numbers may not add due to rounding

Unmanned Surface Vehicles (USV)

USN

The Unmanned Surface Vehicles (USV) is a reconfigurable, multi-mission vessel designed to provide low cost, high endurance, reconfigurable ships able to accommodate various payloads for unmanned missions and augment the Navy's manned surface force. Future missions and payloads will be informed as the concept of operations is developed. While unmanned surface vehicles are new additions to fleet units, they are intended to be relatively low developmental technologies that combine robust and proven commercial vessel designs with existing military payloads to rapidly and affordably expand the capacity and capability of the surface fleet. The program benefits from years of investment and full scale demonstration efforts in autonomy, endurance, command and control, payloads and testing from the Defense Advanced Research Projects Agency (DARPA) Anti-Submarine Warfare Continuous Trail Unmanned Vessel (ACTUV) and Office of Naval Research (ONR) Medium Displacement Unmanned Surface Vehicle (MDUSV)/Sea Hunter and Office of the Secretary of Defense Strategic Capabilities Office (OSD SCO) Ghost Fleet Overlord Large USV experimentation efforts.



Mission: Supports combatant ships by providing additional Anti-Surface Warfare and Strike capacity.

FY 2020 Program: Funds continued development, testing, and procurement of two Large Unmanned Surface Vehicles and continued research and development of payload systems.

Prime Contractor(s): TBD

Unmanned Surface Vehicles (USV)										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	-	-	44.8	-	446.8	2	-	-	446.8	2
Procurement	-	-	-	-	-	-	-	-	-	-
Total	-	-	44.8	-	446.8	2	-	-	446.8	2

Numbers may not add due to rounding

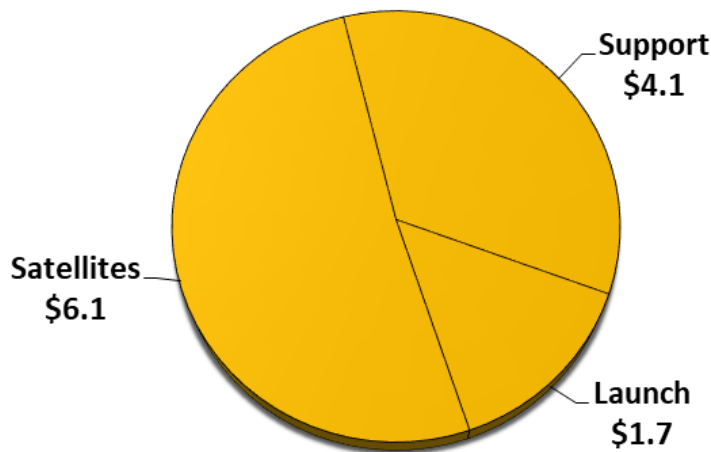
Space Based Systems

Space assets support deployed U.S. forces by providing communications services, navigation capabilities, and information collected by remote sensors such as weather satellites and intelligence collection systems. Space forces contribute to the overall effectiveness of U.S. military forces by acting as a force multiplier that enhances combat power. This investment addresses growing threats, complicating an adversary's ability to counter U.S. space superiority, while enhancing the Department's ability to identify, characterize, and attribute all threatening actions in space. The capability to control space contributes to achieving information superiority and battle space dominance. Procurement of launch vehicles and launch services are typically funded 2 years prior to launch. Under existing budget policy, the first two satellites of a new system are financed with Research, Development, Test and Evaluation (RDT&E) funding and the remainder follow-on satellites are fully funded with Procurement funding.

The FY 2020 budget highlights includes funding for integration and launch costs of the Space Based Overhead Persistent Infrared (OPIR) System space vehicles Geosynchronous Earth Orbit (GEO)-5 and GEO-6, and accelerates development of Next-Generation Overhead Persistent Infrared (OPIR) satellites; continues funding for the Evolved Strategic SATCOM (ESS) and Enhanced Polar System-Recapitalization (EPS-R) developmental satellites, and continues the Space Modernization Initiative RDT&E activities. Also funds the procurement of National Security Space Launch (NSSL) launch services for medium and heavy lift class satellites, specifically four Air Force launch services activities.

FY 2020 Space Based Systems Total: \$11.9 Billion

\$ in Billions



Numbers may not add due to rounding

National Security Space Launch



The National Security Space Launch program, formerly known as the Evolved Expendable Launch Vehicle (EELV), provides launch services for medium and heavy lift class satellites to the Air Force, Navy, the National Reconnaissance Office (NRO), and other government agencies.

Mission: Provides launch services and support for medium to heavy class national security space satellites.

FY 2020 Program: Procures four Air Force launch services. All four are planned for competition, which are usually ordered not-later-than 24 months prior to the planned mission unless additional first time integration is needed; funds Launch Service Support (LSS) effort, which are non-discrete tasks necessary to support a sustained national security space readiness posture. Continues launch service investment in public private partnerships to provide two commercially-viable, domestic space launch service providers.



Photos courtesy of ULA and SpaceX

Prime Contractor(s): Blue Origin; Kent, WA
 Northrop Grumman Innovation Systems (NGIS); Chandler, AZ
 SpaceX; Hawthorne, CA
 United Launch Alliance (ULA); Centennial, CO

National Security Space Launch										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	381.9	-	443.0	-	432.0	-	-	-	432.0	-
Procurement	1,392.9	2	1,614.5	5	1,237.6	4	-	-	1,237.6	4
Total	1,774.7	2	2,057.6	5	1,669.6	4	-	-	1,669.6	4

Numbers may not add due to rounding

Global Positioning System III and Projects



The Global Positioning System (GPS) provides world-wide, 24-hour a day, all-weather 3-dimensional positioning, navigation, and precise timing (PNT) information for military and civilian users. The GPS III space vehicles will be fully backward compatible with legacy signals while delivering new capabilities and enhancements to include a new Galileo-compatible signal (civilian), and a more powerful M-code (military) signal. The GPS Next Generation Operational Control System (OCX) will enable operational use of all modernized GPS signals, as well as enabling improved PNT performance. Military GPS User Equipment (MGUE) provides a robust positioning, navigation, and timing capability to warfighters on the ground, as well as aircraft, ships, and weapons, enabling continued operations in the most contested environments.

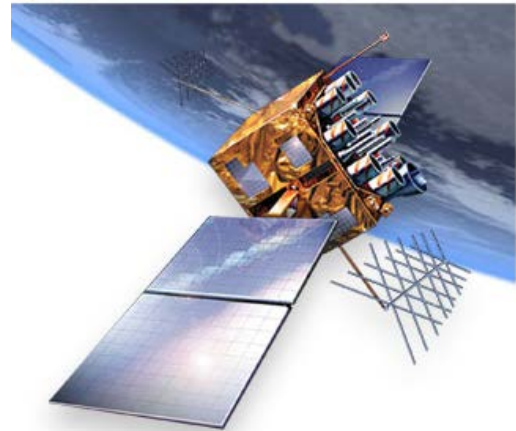


Image courtesy of Lockheed Martin

Mission: Provides worldwide PNT to military and civilian users.

FY 2020 Program: Funds launch campaign and on-orbit checkout for GPS III Space Vehicles (SVs) 03 and 04 and procures independent, technical, systems engineering and integration support critical to managing SVs 05-10 production milestones. Funds continued development of the GPS III Follow-on satellites (SV 11+) and funds the first of 20 production satellites (SV-13). Continues the development of GPS OCX Blocks 1 and 2, and enhancements to the legacy Operational Control System prior to OCX delivery. Funds the testing and lead platform integration of MGUE Increment 1 and continued development of MGUE Increment 2. Funds the GPS Program Office’s responsibility as the Prime Integrator (Enterprise Integration) to synchronize space, control, and user segment programs and manage civil/military specifications and requirements.

Prime Contractor(s): GPS III and GPS IIIF: Lockheed Martin Corporation; Denver, CO
 GPS OCX: Raytheon Company; Aurora, CO
 GPS MGUE Inc 1: L3 Interstate Electronics Corporation; Anaheim, CA
 Rockwell Collins International; Cedar Rapids, IA
 Raytheon Company; El Segundo, CA

Global Positioning System III and Projects										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	1,054.9	-	1,339.8	2	1,280.6	-	-	-	1,280.6	-
Procurement	99.9	-	85.0	-	476.6	1	-	-	476.6	1
Total	1,154.8	-	1,424.9	2	1,757.2	1	-	-	1,757.2	1

Numbers may not add due to rounding

Space Based Overhead Persistent Infrared (OPIR) Systems 

Next Generation OPIR is the follow-on system to the Space Based Infrared System (SBIRS) that will field a notional five satellite constellation in Geosynchronous Earth Orbit (GEO) and a two satellite constellation in Highly Elliptical Orbit (HEO) with an integrated centralized ground station serving all OPIR space elements. The Next-Gen OPIR will rapidly deliver strategically survivable missile warning that counters adversary advances in missile technology and counter-space systems with added resiliency features.

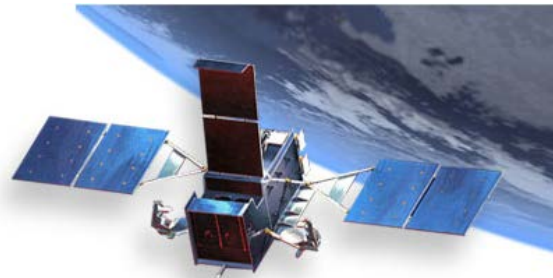


Image courtesy of Lockheed Martin

- The SBIRS HEO-1-4 payloads are on orbit; SBIRS GEO-1, 2, 3 are operationally accepted. GEO-4 satellite launched in Jan 2017; operational acceptance in April 2019
- GEO-5 / GEO-6 satellites scheduled to launch in 2021 / 2022 as replenishment satellites
- SBIRS Ground increment 2 (Block 10) consolidated Defense Space Program (DSP), HEO, GEO operations into a single site in 2017. Block 20 operations acceptance is projected for September 2019
- Next-Gen OPIR space segment Block 0 will rapidly field 3 GEO and 2 HEO free-flyer satellites no earlier than 2026; Block 1 will consist of a solution based on the finalized Capabilities Development Document set for signature in May 2019

Mission: Provides initial warning of strategic missile attack on the United States, its deployed forces, and its allies. Supports missile defense, battlespace awareness, and technical intelligence.

FY 2020 Program: Funds continue development of Next-Gen OPIR (GEO and HEO) satellites and funds the Future Operationally Resilient Ground Evolution (FORGE) ground system development. Funds continue the Space Modernization Initiative (SMI) which consists of three thrust areas: technical maturation, data exploitation, and demonstrations. SMI funds the Wide Field of View Prototype scheduled for launch in 2020 and starts development of a Next-Gen OPIR block 1 operational prototype which will reduce technical risk and target operations in the 2026 timeframe.

Prime Contractor(s): Lockheed Martin; Sunnyvale, CA (SBIRS 5/6 & Ground/Mobile, and Next-Gen GEO);
Northrop Grumman; Redondo Beach, CA (Next-Gen Polar)

Space Based Overhead Persistent Infrared (OPIR) Systems										
	FY 2018		FY 2019		FY 2020					
	\$M	Qty	\$M	Qty	Base Budget		OCO Budget		Total Request	
					\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	559.1	-	703.7	5	1,395.3	-	-	-	1,395.3	-
Procurement	929.1	-	108.4	-	234.0	-	-	-	234.0	-
Total	1,488.1	-	812.1	5	1,629.2	-	-	-	1,629.2	-

Numbers may not add due to rounding

Satellite Communications (SATCOM) Projects



The DoD views SATCOM in three capability sets: strategic for Nuclear Command, Control, and Communications (NC3); protected to enable tactical communications in contested environments; and wideband/narrowband to provide large throughput in benign environments.



Image courtesy of Lockheed Martin

1. Strategic

- Advanced Extremely High Frequency (AEHF) System - Provides today's strategic and protected tactical SATCOM. The constellation will consist of six satellites.
 - AEHF-5 and AEHF-6 are scheduled to extend the constellation life and are planned to launch in 2019 and 2020, respectively.
- Evolved Strategic SATCOM (ESS) – Plans prototypes for next-generation constellation.

2. Protected Tactical

- Enhanced Polar System-Recapitalization (EPS-R) - Plans two host payloads above 65°N.
- Protected Tactical Enterprise Service (PTES) - Provides improved anti-jam SATCOM.
- Protected Tactical SATCOM (PTS) – Plans prototypes to demo new technologies.

3. Wideband and Narrowband

- Wideband Global SATCOM (WGS) - WGS-10 projected to launch in FY 2019. The WGS-11 and WGS-12 are pending contract award as replenishment satellites.
- Commercial SATCOM (COMSATCOM) - Procures wideband SATCOM services.
- The Multi User Objective System (MUOS) provides UHF voice and data communications.

Mission: Provides survivable, anti-jam, low probability of detection/intercept, and worldwide secure communications for tactical and strategic users.

FY 2020 Program: Funds the on-orbit testing of the AEHF-5 space vehicle and continues the production oversight of the AEHF-6 space vehicle. Continues selected strategic, protected tactical, and wideband SATCOM development activities.

Prime Contractor(s): AEHF and MUOS: Lockheed Martin Corporation; Sunnyvale, CA
WGS: Boeing Satellite Systems; El Segundo, CA

Satellite Communications (SATCOM) Projects										
	FY 2018		FY 2019		FY 2020					
					Base Budget		OCO Budget		Total Request	
	\$M	Qty	\$M	Qty	\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	304.0	-	728.5	2	1,013.4	-	-	-	1,013.4	-
Procurement	770.5	2	102.2	-	99.3	-	-	-	99.3	-
Total	1,074.4	2	830.7	2	1,112.7	-	-	-	1,112.7	-

Numbers may not add due to rounding

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