Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Office of the Secretary Of Defense	Date: May 2017
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603133D8Z / *Foreign Comparative Testing*

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	21.128	24.406	19.343	24.199	-	24.199	24.910	25.570	26.092	26.632	Continuing	Continuing
P313: *Foreign Comparative Testing*	21.128	24.406	19.343	24.199	-	24.199	24.910	25.570	26.092	26.632	Continuing	Continuing

Note

The Foreign Comparative Testing (FCT) Program Element (PE) 0603133D8Z focuses on Pre-Engineering and Manufacturing Development (Pre-EMD) and Proof of Principle prototypes derived from evaluation of foreign equipment that will provide the U.S. Armed Services, U.S. Special Operations Command (USSOCOM), and Defense agencies capabilities to counter emerging threats. FCT's broad reach across our allies and friendly foreign countries enables development of innovative, cost effective, and interoperable solutions for the Department of Defense (DoD), Multi-Service and Combatant Command (CCMD) priority requirements. FCT also increases competition, ensuring our personnel have access to the best technology available.

A. Mission Description and Budget Item Justification

The FCT program supports the warfighter by leveraging technologies and equipment developed by allied nations and coalition partners to counter emerging threats, thereby accelerating the DoD acquisition process and lowering development costs. FCT supports DoD best practices by incentivizing the use of prototyping and experimentation in advancing technological solutions to warfighter problems and acts as a hedge against threat developments. FCT enhances interoperability, facilitates international collaboration, increases competition in innovation, and enables more efficient and affordable transition of technologies into acquisition programs of record. Authorized by Title 10, U.S. Code, Section 2350a (g), the FCT program is managed by the Office of Secretary of Defense (OSD) Deputy Assistant Secretary of Defense Emerging Capability & Prototyping (DASD(EC&P)), Comparative Technology Office (CTO). FCT projects are sponsored by the Military Services and USSOCOM. Evaluation processes for project selection include a detailed review to confirm the proposed item addresses valid requirements and DoD priorities, a thorough market survey, and an emphasis on transitioning technologies into current or future programs of record.

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Office of the Secretary Of Defense	Date: May 2017
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603133D8Z / *Foreign Comparative Testing*

B. Program Change Summary ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	24.782	19.343	24.387	-	24.387
Current President's Budget	24.406	19.343	24.199	-	24.199
Total Adjustments	-0.376	0.000	-0.188	-	-0.188
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.376	-			
• Baseline adjustment for higher priorities and requirements	-	-	-0.188	-	-0.188

Change Summary Explanation

The FY 2017 to FY 2018 profile increase reflects funding for Department priorities supporting DoD best practices objectives to promote effective competition by improving DoD outreach for technology and products from global markets through risk reducing prototypes.

The FY 2018 baseline decrease of -$0.188 million reflects adjustments for higher DoD priorities.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Office of the Secretary Of Defense			Date: May 2017
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603133D8Z / *Foreign Comparative Testing*	Project (Number/Name) P313 / *Foreign Comparative Testing*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
P313: *Foreign Comparative Testing*	21.128	24.406	19.343	24.199	-	24.199	24.910	25.570	26.092	26.632	Continuing	Continuing

A. Mission Description and Budget Item Justification

The FCT program supports the warfighter by leveraging technologies and equipment from allied nations and coalition partners to counter emerging threats, thereby accelerating the DoD acquisition process and lowering development costs. FCT supports Better Buying Power 3.0 by incentivizing the use of prototyping and experimentation in advancing technological solutions to warfighter problems and acts as a hedge against threat developments. FCT enhances interoperability, facilitates international collaboration, increases competition in innovation, and enables more efficient and affordable transition of technologies into acquisition programs of record. Authorized by Title 10, U.S. Code, Section 2350a (g), the FCT program is managed by the Office of Secretary of Defense (OSD) Deputy Assistant Secretary of Defense Emerging Capability & Prototyping (DASD(EC&P)), Comparative Technology Office (CTO). FCT projects are sponsored by the DoD Services and USSOCOM. Evaluation processes for project selection include a detailed review to confirm the proposed item addresses valid requirements and DoD priorities, a thorough market survey, and an emphasis on transitioning technologies into current or future programs of record.

The FCT program is a catalyst for teaming and other business relationships between foreign and U.S. industries. Many successful FCT projects result in the licensed production of a qualified foreign item in the United States. Other nations recognize the long-term value of such practices for competing in the U.S. Defense market and the resultant strengthening of the "two-way street" in Defense procurement. The result often means the creation of jobs and contributions to local economies throughout the United States. To date, companies from 34 states benefited from FCT projects.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Lightweight M3A1 Recoilless Rifle (Army)	1.195	-	-
Description: The M3 Carl Gustaf 84 millimeter (mm) Recoilless Rifle is a reliable, battle-proven, reusable shoulder-fired weapon system first introduced to the Army by FCT in 1991. This M3A1 project will eliminate six pounds (28 percent) from the existing weapon by replacing the existing steel tube with a titanium alloy tube, along with other components (bolt, trigger, venturi, and ancillary parts) without changing the firing procedures, operations or ammunition. Since no operational characteristics will be changed, this low-risk approach will produce a lighter weight 84mm shoulder-fired weapon for less cost and time than normally required to test and qualify a new weapon system.			
FY 2016 Accomplishments: Conducted contractor's reliability test along with an M3A1 trainer and maintenance class to address the operation of the weapon, inspection process, repairs and spare parts. Aberdeen Test Center conducted the qualification testing of the M3A1 test hardware with base-line firings. The manufacturer conducted a tube burst test witnessed by Army Test and Evaluation Command and non-government engineers. FY 2016 funding will continue to be used in FY 2017 to: resolve accuracy issues at 500 meters and complete weapon accuracy testing; conduct air drop testing on the M3A1 at Yuma Proving Ground; receive M3A1 Final			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Office of the Secretary Of Defense		Date: May 2017
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603133D8Z / *Foreign Comparative Testing*	**Project (Number/Name)** P313 / *Foreign Comparative Testing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Safe Service Life from the Army's Benet laboratory; finalize M3A1 joint service test plan and schedule as per the Army Weapon Systems Safety Review Board (AWSSRB); go forward with a Milestone C decision in 3Q FY 2017; and complete close-out report.			
Title: Soldier Power with Inductive Recharge & Intelligent Textiles (SPIRIT) (Army) ***Description:*** The SPIRIT system incorporates e-textiles for power and data distribution, provides "plug-and-play" capability for various Soldier worn systems, and communicates control signals from an end-user-device. The proposed system addresses future capabilities for Small Unit Power Increment II/III as defined by Army Maneuver Center of Excellence for e-textiles and wireless charging as well as requirements for United States Marine Corps (USMC) Marine Enhancement Program. USMC is interested in the technology and will participate in project reviews. Specifically, the e-textile capability will provide the capability to distribute power and data without using cables and be able to wirelessly re-charge an attached battery thus reducing the soldier's load. ***FY 2016 Accomplishments:*** Phase 1 of project completed. Phase 1 consisted of: requests for official quotes from industry; evaluating official quotes; and initiating procurement of hardware for testing. Contract was written and awarded. Test articles were shipped to the contractor for upgrades. ***FY 2017 Plans:*** Phases 2-4 of the project will be completed. Phase 2 testing will consist of: power and data performance evaluation; support integration with current equipment for testing; perform government laboratory testing on an integrated system to inform future requirements and technology development; and mitigate system integration risks not previously identified. Perform Electro-Magnetic Interference testing of prototypes to ensure there is no degradation to nearby communications systems as well as evaluate detectability of the soldier with handheld radios connected to the e-textile vest. Phase 3 will support a Go/No-Go decision by evaluating test data to determine if the hardware is mature enough to warrant evaluation in a field environment. Phase 4 will be a demonstration of prototypes at the OSD Joint Infantry Company – Power event. Write test reports and FCT closeout report.	1.310	0.300	-
Title: Mobile Land Based Anti-Ship Fires (Army) ***Description:*** Integrate existing Norwegian Naval Strike Missile (NSM) and four-pod launcher onto a standard U.S. Army Palletized Load System (PLS) flat rack and demonstrate NSM launch and engagement of an over-the-horizon maritime target. This Heavy Expanded Mobility Tactical Truck (HEMTT) mounted system enables Army and Marine Corps forces to support joint force freedom of movement and action through the projection of power from land into the maritime domain. Currently, there is no mobile, land-based, over-the-horizon anti-ship warfare capability. The goal of this project is to evaluate an asset that might cover this capability gap.	0.300	1.000	1.200

Exhibit R-2A, RDT&E Project Justification: FY 2018 Office of the Secretary Of Defense		Date: May 2017
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603133D8Z / *Foreign Comparative Testing*	**Project (Number/Name)** P313 / *Foreign Comparative Testing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
FY 2016 Accomplishments: Received test articles and specialized testing equipment. Conducted benchmark testing. ***FY 2017 Plans:*** Conduct kickoff meeting to formally plan specific path forward. Negotiate hardware and cost sharing plan with the contractor and establish optimal contract vehicle. Complete Phase 1 Launcher/Pallet integration analysis, Phase 2 Advanced Field Artillery Tactical Data System (AFATDS) Modification/Integration, and Phase 3 AFATDS/Link 16 Integration. ***FY 2018 Plans:*** Demonstrate the system in operational scenarios. Document performance in each scenario. Complete final test report and FCT closeout. If successful, transition the HEMTT mounted NSM as an interim Mobile Land Based Anti-Ship Fires capability while the Army develops an organic capability, currently planned for Long Range Precision Fires Increment 2.			
Title: Integrated Fire Control System for Medium Anti-Armor Weapon Systems (MAAWS) (Army) ***Description:*** The Aimpoint Fire Control System (FCS) consists of an integrated, eye-safe, 1550 nanometer Laser range finder, a ballistic computer with the capability to store up to 50 different ballistic algorithms, and a parallax free optical channel with unlimited eye relief. System automatically compensates for the ballistic drop of projectiles, propellant temperature and terrain angle. A MAAWS equipped with the Aimpoint FCS will provide the warfighter with an enhanced accurate/rapid engagement capability that significantly improves first round probability of hit (day/night) with less collateral damage and increased survivability/ lethality due to improved suppression of enemy forces. ***FY 2016 Accomplishments:*** Received funding, ordered test articles and specialized testing equipment. Conducted test planning. ***FY 2017 Plans:*** Receive test articles and complete upgrade to software in the units to enable them to track moving targets. Complete Phase I (characterization testing): physical & optical characteristics, ballistic compensation and alignment, Laser range finder, power consumption and battery life. Go/no-go decision. ***FY 2018 Plans:*** Complete Phase II: adverse environment, life cycle and performance moving target testing. Go/no-go decision. Complete test report and FCT close-out report. If test is successful, a type classification and full materiel release effort will be pursued for the Army.	0.300	0.675	0.270
Title: E-band Communications (Air Force)	0.875	0.410	-

Exhibit R-2A, RDT&E Project Justification: FY 2018 Office of the Secretary Of Defense		Date: May 2017
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603133D8Z / *Foreign Comparative Testing*	**Project (Number/Name)** P313 / *Foreign Comparative Testing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Description: Provide increased situational awareness and military effectiveness for the warfighter. This project evaluates an E-band (71-86 gigahertz) radio system's capability to increase communications throughput by an order of magnitude or greater over deployed military systems. ***FY 2016 Accomplishments:*** Received test articles and specialized testing equipment. Conducted benchmark testing. ***FY 2017 Plans:*** Demonstrate the system in operational scenarios such as ground-ground, ship-ship, and ship-shore. Document performance in each scenario. Complete final test report and FCT closeout. If successful, potential for transition to future Air Force 71-86 gigahertz Satellite Communications Programs currently in development or other Service applications.			
Title: Rifle Accessory Control Unit (RACU) (Navy/USMC) ***Description:*** This project will assess and evaluate the capabilities of RACU, a one-handed, on-the-move, intuitive, programmable device that will allow operation of all rifle accessories and communication equipment through a central control point. The RACU will make it easier for Marine rifleman to manage multiple accessories and employ them faster. RACU will also help maintain the rifleman's focus and situational awareness. ***FY 2016 Accomplishments:*** Completed Phase I test plan and ordered test articles. Test articles are expected in early 2Q FY 2017. FY 2016 funding will continue to be used in FY 2017 to: complete Phase I Performance Testing 2Q-3Q FY 2017; complete Phase I Usability Test 3Q-4Q FY 2017; and initiate Phase II fabricated test articles 4Q FY 2017. FY2016 funding will also be used to complete Phase II Environmental/Shock & Performance Testing 1Q-2Q FY 2018; complete Phase II Usability Test; and complete final test report and FCT closeout. If successful, potential for transition to USMC Program Manager Marine Expeditionary Rifle.	3.000	-	-
Title: Compact High Power Radio Frequency Directed Energy (HPRF-DE) Source (Navy/USMC) ***Description:*** This project will test state-of-the-art HPRF magnetron microwave tubes and solid state power modulators, and evaluate the non-lethal effects offered by this flexible modulator technology. This approach provides the warfighter a capability between "shouting and shooting" by delivering electromagnetic energy that will disrupt, disable, or potentially destroy critical vehicle/vessel electronic circuitry. HPRF-DE is currently in use in United Kingdom and supports Joint Non-Lethal Directorate and Naval Surface Warfare Center Dahlgren Division. ***FY 2016 Accomplishments:***	0.981	1.217	0.443

Exhibit R-2A, RDT&E Project Justification: FY 2018 Office of the Secretary Of Defense		Date: May 2017
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603133D8Z / *Foreign Comparative Testing*	**Project (Number/Name)** P313 / *Foreign Comparative Testing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Received Phase I test article and component checkout at the end of 3Q FY 2016. Completed Open Air Effects Testing in 4Q FY 2016. ***FY 2017 Plans:*** Perform data analysis and reporting from the Open Air Effects Testing at Naval Surface Warfare Center, Dahlgren Division 1Q FY 2017. Review proposal input in 2Q FY 2017. Perform Test Planning and Test Readiness Review 3Q-4Q FY 2017. Receive Phase II Test Articles 4Q FY 2017. ***FY 2018 Plans:*** Complete Phase II Radio Frequency Output Characterization test during 1Q FY 2018. Complete Phase II Static Open Air Effects test in 2Q FY 2018. Complete System Safety Analysis, Prototype Vessel Temporary Installation and Integration, and Dynamic Developmental Testing and provide transition decision in 4Q FY 2018. Complete technical test reports during 4Q FY 2018. If successful, potential transition to various vehicle or vessel stopping programs within the Coast Guard, Navy, and Marine Corps.			
Title: Soldier/Sniper Weapon Observation Reconnaissance Device (SWORD) (Navy/USMC) ***Description:*** This project will test the SWORD targeting and Blue Force command and control system which is based on commercial Android technology, multiple commercial communications standards, and a weapon based integrated power, data and navigation system. Testing data will assist in modifying current design for fully integrating system components into available tactical networks and provide more of a system of systems configuration. SWORD can enhance the survivability and lethality of the warfighter by providing enhanced shared situational awareness and advanced targeting and data dissemination capabilities. ***FY 2016 Accomplishments:*** Developed lab test plan 3Q-4Q FY 2016. Fabricated test articles 3Q-4Q FY 2016. Received test articles in 4Q FY 2016. ***FY 2017 Plans:*** Complete Phase I bench test and prototype assembly in 1Q FY 2017. Complete prototype test by end of 2Q FY 2017. Complete Phase II Comparative Analysis Report by end of 2Q FY 2017. Initiate limited field testing early 3Q FY 2017. Using FY 2017 funding this project will in FY 2018: conduct field test planning, complete field test 1Q-3Q FY 2018 and complete technical test reports during 4Q FY 2018. If successful, potential for transition to Program Manager Marine Intelligence.	0.550	0.480	-
Title: Enhanced Shipboard Navigation (Navy) ***Description:*** This effort will test and evaluate the capability of a multi-constellation Global Navigation Satellite System (GNSS) receiver to function as an additional navigation source to existing military Global Positioning System (GPS) solutions for U.S. Naval surface ship and airborne applications. This testing will provide valuable insight into the potential benefits of using these signals in a U.S. military environment. Differences in positioning and timing between the foreign GNSS receiver and the platform's principal military GPS receiver may indicate to the platform that it should select an alternate, non-satellite navigation source.	0.295	0.670	0.260

Exhibit R-2A, RDT&E Project Justification: FY 2018 Office of the Secretary Of Defense		Date: May 2017
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603133D8Z / *Foreign Comparative Testing*	**Project (Number/Name)** P313 / *Foreign Comparative Testing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
FY 2016 Accomplishments: Received first operational prototype, tested basic GNSS functionality in collaboration with U.S. Naval Observatory, and initiated prototype test article and software modifications 1Q-2Q FY 2016. ***FY 2017 Plans:*** Complete GNSS test equipment modifications 1Q FY 2017 and test foreign GNSS receivers as an integrated enhancement to existing navigation systems 3Q FY 2017. Initiate test report 3Q FY 2017. ***FY 2018 Plans:*** Complete final test and prepare closeout and test reports for decision package 1Q-2Q FY 2018. If successful, potential for transition to the Global Positioning Navigation and Timing Systems program of record.			
Title: Small Global Positioning System (GPS) Anti-Jam Antenna for H-1Y/Z (Navy) ***Description:*** This effort will demonstrate all criteria needed for proceeding with a major fielding program for a small GPS anti-jam smart antenna solution for the H-1Y/Z aircraft. This small GPS anti-jam smart antenna system will be a common material solution for the UH-1Y and AH-1Z as both platforms currently share the same unprotected antenna-to-GPS receiver navigation system architecture. This new antenna system when coupled to an Embedded GPS/Inertial Navigation system will eliminate mission capability gaps associated with a variety of H-1Y/Z missions adversely affected in a GPS signal degraded anti-access/area denial environment. The UH-1Y and AH-1Z helicopters are among the last Marine manned platforms without a GPS anti-jam antenna system as small anti-jam solutions were not available until now due to size, weight and power limitations. ***FY 2016 Accomplishments:*** Completed anechoic chamber test plan 2Q FY 2016. Performed anechoic chamber testing 3Q FY 2016. Completed indoor test report and analysis 3Q–4Q FY 2016. ***FY 2017 Plans:*** Develop operational flight test plan during 1Q FY 2017. Perform operational flight test in late 2Q FY 2017. Make transition and procurement decision 4Q FY 2017. If successful, plans in place to transition to PMA-276 Light Attack Helicopters.	0.385	0.800	-
Title: Low Cost Autonomous Classification (Navy) ***Description:*** This project will test an Australian-developed signal processing algorithm and sensor based on underwater measurement of acoustic intensity at low frequency near the seafloor. The algorithm has the ability to robustly classify surface and sub-surface targets. The collaborative at-sea evaluation will be done at the Stirling Naval Base, off the coast of Western Australia, with logistics support provided by the Royal Australian Navy fleet. ***FY 2016 Accomplishments:***	0.016	0.684	0.600

Exhibit R-2A, RDT&E Project Justification: FY 2018 Office of the Secretary Of Defense		Date: May 2017
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603133D8Z / *Foreign Comparative Testing*	**Project (Number/Name)** P313 / *Foreign Comparative Testing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Initiated processing of project agreement (PA) with the Navy International Programs Office 4Q FY 2016. ***FY 2017 Plans:*** Award contract 3Q FY 2017; complete test plan 3Q FY 2017 and access and review foreign processing software 3Q–4Q FY 2017. ***FY 2018 Plans:*** Complete PA processing; conduct at sea testing 1Q FY 2018; complete evaluation and test reports 3Q–4Q FY 2018 and make procurement decision 4Q FY 2018.			
Title: Rapid Three-Dimensional (3D) Terrain Mapping (United States Special Operations Command) ***Description:*** This project evaluates the capability of a foreign system to provide rapid high-resolution 3D geo-spatial terrain data and produce a shareable global map for navigation in GPS denied or degraded areas. This new, robust capability will provide the war-fighter with expedient, precise, 3D navigational tools necessary for effective mission planning, digital close air support, and battle-space awareness. ***FY 2016 Accomplishments:*** National Geospatial-Intelligence Agency supported Special Operations Forces operational requirements in the Arabian Peninsula and North Africa using 3D terrain data in semi-permissive areas. Army Geospatial Center mapped several areas of interest in Iraq and Syria. Geoprocessing software was used by USSOCOM to automate labor-intensive data fusion. FCT close- out report was submitted.	1.020	-	-
Title: Airborne Lean Services Architecture (United States Special Operations Command) ***Description:*** Evaluates software and open architecture standards that provide innovative tactical and terrestrial network services oriented architecture. This enables affordable, flexible, and dynamic systems interoperability, automation, and security within and between Special Operations Forces (SOF), conventional, coalition aircraft, surface forces, and command and control operating nodes/platforms. ***FY 2016 Accomplishments:*** Conducted initial reviews. Received test articles and specialized testing equipment. Conducted lab benchmark testing. Initiated ground and airborne testing. ***FY 2017 Plans:*** Complete ground and airborne testing. Complete final test report and FCT closeout. If successful, potential to transition software to SOF Airborne Mission Networking program office and Tactical Local Area Network program.	0.600	0.950	-
Title: Low Cost Innovative Projects (Projects Less Than One Million Dollars Each):	13.579	4.413	-

Exhibit R-2A, RDT&E Project Justification: FY 2018 Office of the Secretary Of Defense		Date: May 2017
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603133D8Z / *Foreign Comparative Testing*	**Project (Number/Name)** P313 / *Foreign Comparative Testing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Description: OSD CTO selected multiple low cost projects in the areas of Force Protection, Force Support, Anti-Access/Area Denial, Robotics and Autonomous Systems, Interoperability and Countering Unmanned Systems. These projects were selected to deliver proof of principle prototypes for evaluation, assessment, and Service adoption within 24 to 36 months. ***FY 2016 Accomplishments:*** - Low Cost Small Satellite Technologies (Navy): Evaluated mature foreign satellite components to provide innovative and cost effective technologies from global marketplace to enhance capabilities and affordability. Surveyed applicable worldwide technologies that can provide desired Maritime Domain Awareness capability onboard small satellites, including advertised performance specifications, issues, and cost information. Conducted capabilities tradeoff study with recommended component selection action plan. Acquired test articles. Additional efforts in FY 2017 using FY 2016 funds include: conduct attitude determination and control, radio, and software testing. Complete test and closeout reports. - Underwater Wireless Power Transfer (Navy): Evaluated foreign wireless power transfer systems for potential use in Navy underwater systems and other military applications to shape emerging requirements for platforms currently in development. Procured test articles and conducted Phase I bench-top testing in the lab. Initiated Phase II test planning and established test environment. Additional testing scheduled in FY 2017. - Holographic Immersion Simulation System (Navy): Tested a deployable training system that renders 3D holographic environments at interactive frame-rates to provide greater training realism and develops faster reactionary skills and improved decision-making. Completed Phase I contract award preparation 4Q FY 2016. Additional testing scheduled in FY 2017. - High Efficiency Flexible Photovoltaics (Navy): Tested high efficiency, lightweight, flexible solar cells for cross-domain military applications that will increase power for Unmanned Aerial Vehicles, small satellites, man-portable and ground-based renewable-energy systems. Initiated fabrication of test articles 3Q FY 2016. Completed Phase I test planning during 4Q FY 2016. Additional testing scheduled in FY 2017. - Small Unmanned Aerial Vehicle (UAV) Payload with Laser Designator (Navy): Tested a compact, high-definition, full motion video payload on the RQ-21A Blackjack that enables laser designation from Navy/Marine Corps Tier II UAVs. Conducted integrated flight test on UAV 2Q-4Q FY 2016. Additional efforts in FY 2017 using FY 2016 funds include: Complete laser designation demonstration in support of USMC AH-1Z attack helicopter early FY 2017 with procurement decision by 2Q FY 2017. - Mobile Gunnery Live Fire Monitoring System (Navy/USMC): Evaluated a Tank and Infantry Fighting Vehicle gunnery training system that wirelessly transmits live audio/visual and weapon systems data to a mobile monitoring station; increases crew's gunnery skills and first round on target accuracy. Completed test planning during 3Q FY 2016. Performed Phase III data collection of U.S. Marine Corps Light Armored Vehicle during 1Q–3Q FY 2016; Conducted Live Fire Test with Assault Amphibious Vehicle and initiated test article fabrication in 4Q FY 2016. A procurement decision will be made in 3Q FY 2017 following performance testing and field user evaluations.			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Office of the Secretary Of Defense		Date: May 2017
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603133D8Z / *Foreign Comparative Testing*	**Project (Number/Name)** P313 / *Foreign Comparative Testing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
- Compact Multi-Diver Heating System (Navy): Heating system composed of a vapor compression unit, battery, umbilical cords, and liquid circulating garments for wet submersibles (i.e., SEAL Delivery Vehicle) to provide thermal balance for up to eight divers in cold water. Conducted performance verification of prototype 1 in 1Q FY 2016. Vendor built and tested depth-capable prototype 2 in 2Q FY 2016. Performed unmanned performance verification for operation at depth in 4Q FY 2016. Conducted manned performance tests in a chilled test pool with the integrated system in 4Q FY 2016. Vendor began construction of production representative item in 4Q FY 2016. Additional efforts in FY 2017 using FY 2016 funds include: complete analysis, study and integration data 1Q FY 2017. Perform operational and user assessment 1Q–3Q FY 2017. Prepare test report and decision package 4Q FY 2017. - Software Defined Networking (SDN) (Navy): Tested commercially available, advanced computer network solutions designed with open standards to enhance network performance, increase security, and reduce costs. Completed testing of prototypes 1Q-2Q FY 2016. Down-selected to best SDN monitoring and control technologies 2Q FY 2016. Initiated Phase II final testing in late FY 2016. Additional testing scheduled in FY 2017. - H-1 Crash-resistant, Ballistic-tolerant, Fuel Cell Qualification (Navy): Qualified a second source for AH-1Z & UH-1Y fuel tanks that can survive a crash from an altitude of 65 feet because the current vendor cannot support the production & quality needs. Initial testing successfully completed 2Q FY 2016. Received Phase I Cube test articles in 2Q FY 2016. Initiated Phase I Test Cube Qualification 3Q FY 2016. Additional efforts in FY 2017 using FY 2016 funds include: conduct Phase I test cube qualification through 2Q FY 2017 and complete test and closeout reports. - Multifunctional Information Distribution System-Joint Tactical Radio System (MIDS-JTRS) Radio Frequency Amplifier (Navy): Tested a prototype that has the potential to reduce procurement costs, improve thermal management and networking capabilities with multiple waveforms. Completed qualification testing. Completed flight testing and completed decision package. Anticipate Navy procurement decision during FY 2017. - Aerial Delivery Improvement for Underwater Mines (Navy): Evaluated foreign glide kits for the MK-80 series Joint Direct Attack Munition (JDAM) to provide an inexpensive, precision, medium standoff option for conventional ordnance for the underwater mining mission. Performed drop testing of JDAM compatible wing kits during VALIANT SHIELD 2016 to assess range, accuracy, and survivability in mining configuration. Collected test data and completed a test report. The demonstration results have been provided to Navy leadership for consideration. Procurements are pending follow-on efforts for platform integration. - Pilot Physiological Monitoring and Warning System (Air Force): Tested non-invasive pilot physiological monitoring prototypes (helmet integrated sensors & near infrared spectroscopy) to mitigate pilot fatigue, gravity induced loss of consciousness, and hypoxia-related mishaps. Completed hypoxia study and centrifuge testing which provides a non-invasive, unobtrusive physiological monitoring system that is embedded into the flight helmet. Additional efforts in FY 2017 using FY 2016 funds include: Complete final test report and FCT closeout. If successful, the next phase will be to conduct a flight test of the prototype system which is beyond the scope of the FCT and will be funded by the Air Force. - Field Deployable Whole Blood Collection and Transfusion Set (Air Force): Tested a patented, Food & Drug Administration (FDA) approved, whole blood filter integrated into a ruggedized prototype for military use to enable whole blood collection and			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Office of the Secretary Of Defense		Date: May 2017
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603133D8Z / *Foreign Comparative Testing*	**Project (Number/Name)** P313 / *Foreign Comparative Testing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
transfusion in forward deployed settings to improve battlefield casualty survival rates. Completed testing of the filtration and storage studies which leverages a currently FDA approved filter/kit and reconfigures its capability to permit safer whole blood transfusions in the field. Additional testing scheduled in FY 2017. - Photonic Enhancements to the Science and Technology in Electronic Warfare Systems (Air Force): Evaluated a prototype 1-40 gigahertz receiver with near simultaneous optical signal processing/identification to enable agile Electromagnetic Spectrum operations. Completed performance and operational testing. Additional efforts in FY 2017 using FY 2016 funds include: Evaluate system in upcoming Sensors demonstration exercises and complete final test report and FCT closeout. No immediate transition path exists; however, the Air Force and Navy are exploring potential transition opportunities for this prototype system with future programs. - Gallium Nitride (GaN) Amplifier Performance and Reliability Investigation of commercial-off-the-shelf (Air Force): Tested foreign GaN technology with 5-10X performance improvement over existing Gallium Arsenide technology to provide improved components for radar, navigation, communications, and other electronic systems. Conducted benchmark testing and initiated robustness testing. Additional efforts in FY 2017 using FY 2016 funds include: Test foreign GaN technology with 5-10X performance improvement over existing gallium arsenide technology to provide improved components for radar, navigation, communications, and other electronic systems. Complete robustness testing, complete final test report, and FCT closeout report. If successful, select GaN amplifier parts will be evaluated for space radiation tolerance in a follow-on FCT effort in FY 2017-2018 supporting the Air Force Research Laboratory's Space Vehicle directorate and programs. - Solar Power Shelter System (Army): The Solar Power Shelter System inserted into the Force Provider Expeditionary base camp modules provides the warfighter a substantial capability increase in force protection and sustainability. Conducted engineering analysis study and completed Phase One technical testing with completed test report. Completed ballistics testing and Phase Two operational integration assessment, completed test reports, prepared decision packet and close out report. Anticipate Army procurement decision during FY 2017. - Improved Steels (Army): U.S. Army is investigating new classes of high nitrogen steels that may improve durability and protection of tactical vehicles. Completed administrative and technical, scheduling and purchased materials, equipment, and supplies in preparation for testing. Materials received and sent to vendor for rolling and heat treatment of test material. Conducted qualification test to demonstrate improved properties: mechanical, corrosion, ballistic. Additional testing scheduled in FY 2017. - Sappheiros System Unattended Ground Sensing and Monitoring System (Army): Sappheiros system is an unattended ground sensor comprised of dozens of miniaturized sensors (seismic-acoustic, visual, and radar) rapidly deployed to detect suspected enemy activity over large areas for long periods. Completed test reports to see if the sensor system is compatible with satellite communications (SATCOM). Developed a task plan for system upgrade specifically to enable the autonomous system to be interoperable with open standards for unattended sensors and incorporate SATCOM for long haul communications. Additional testing scheduled in FY 2017.			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Office of the Secretary Of Defense		Date: May 2017
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603133D8Z / *Foreign Comparative Testing*	**Project (Number/Name)** P313 / *Foreign Comparative Testing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
- Evaluation of Towed Jumper Release System (Army): The Hung-Up Parachutist Release Assembly (HURPA) is an emergency parachute system used to safely descend a towed jumper, which is an Airborne soldier, whose equipment did not function correctly and is being dragged outside the aircraft. Procured HUPRA systems and the safety confirmation to evaluate the HUPRA for static-line missions. Additional testing scheduled in FY 2017. - Soldier Borne Sensor Systems (Army): The Soldier Borne Sensor System allows the Army Squad to have situational awareness in a variety of combat conditions thereby reducing risk. Evaluated range, speed, detectability, and camera performance against current requirements and any gaps or risk areas that have been identified. Completed test reports on technical capabilities. Additional efforts in FY 2017 using FY 2016 funds include: Evaluate performance in operationally relevant environments including human factors, environmental limitations and overall system performance. Write closeout report. The knowledge products and hardware will be transitioned in 4Q FY 2019 to Army Product Manager Soldier Maneuver Sensors (PdM SMS). - Hazardous Chemical Exploitation System (SOCOM): Provided the tools necessary for military personnel to expediently access hazardous chemical/materials, ordnance or storage containers and develop a validated on-site disposal or transfer system. Performed test readiness review. Continued advanced tool testing and system validation to validate tactics, techniques, and procedures. Program Manager submitted final test report, and provided technical data to USSOCOM Acquisition Authority for Milestone C Decision. FCT Close-Out Report submitted. - Millimeter Wave Sensing for Autonomy (Navy/USMC): This effort will test and evaluate millimeter-wave automotive radar technology from Austria. Naval Research Laboratory, in partnership with the Army Research Laboratory, will modify the hardware for airborne operation. They will also demonstrate and evaluate the technology and use the findings as the basis for form/fit/function analysis on active electronically scanned array sensor for low-cost unmanned aircraft systems. Additional efforts in FY 2017 using FY 2016 funds include: Complete contract award, test plan and receive test articles. Complete testing and close-out report. If successful, the primary transition path will be the Low-Cost UAV Swarming Technology Innovative Naval Prototype effort scheduled for FY 2018-2022.			
FY 2017 Plans: - Software Defined Networking (SDN) (Navy): Complete Phase II testing and conduct demonstration of feasibility and benefits of SDN monitoring and control technologies 3Q FY 2017. Complete closeout and test report for decision package 4Q FY 2017. - High Efficiency Flexible Photovoltaics (HEFP) (Navy): Complete laboratory acceptance testing 2Q FY 2017; complete test article panels 1Q FY 2017; and initiate Phase II field testing and reporting. If successful, transition decision to occur in 2Q FY 2018 following application field testing. - Holographic Immersion Simulation System (Navy): Purchase test articles in 2Q FY 2017. Perform test article integration and training. Perform data collection analysis and reporting in 3Q FY 2017 and initiate phase II test article procurement and testing 4Q FY 2017. If successful, transition decision expected in 2Q FY 2018 following user assessments. - Underwater Wireless Power Transfer (Navy): Perform Phase II benchtop testing in water; perform Phase III pier-side testing to demonstrate power, efficiency, and communication speed characterization; and make transition decision.			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Office of the Secretary Of Defense		Date: May 2017
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603133D8Z / *Foreign Comparative Testing*	**Project (Number/Name)** P313 / *Foreign Comparative Testing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
- Improved Steels (Army): Write test reports, new material specification and FCT close out report. If successful, this new material specification is expected to transition in 4Q FY 2017 to PEO Ground Combat Systems. - Sappheiros System Unattended Ground Sensing and Monitoring System (Army): Developmental Testing: determine system communications ranges, system detection ranges, system emplacement characteristics, and mission duration. Operational testing: Assess the potential integration with Fires and the effectiveness of sensors and imagers for accomplishing target identification and battle space situational awareness. This effort may become part of a systems approach towards a materiel solution for Ottawa Treaty compliance. Information collected during this effort will inform Army and USMC ground sensor requirements. - Evaluation of Towed Jumper Release System (Army): Conduct static line evaluation of the Hung-Up Parachutist Release Assembly on C-130 ramp exits during a towed jumper malfunction for T-11, MC-6 and RA-1 parachute systems. Write technical evaluation report. Write closeout report. Anticipate Army procurement decision in 3Q FY 2018.			
Title: Asymmetric Force Application and Autonomous Systems Focus Areas	-	3.872	10.807
Description: FCT will invest in cross-domain, innovative, non-traditional technologies for new and emerging capabilities from international partners to enable cost-leveraging, increase competition, and provide more efficient solutions for our forces during maneuver and engagement operations. Solutions will reduce U.S. reliance on overleveraged blue capabilities and creatively exploit increasingly capable adversary systems while adjusting the cost curve in our favor. Applications of particular interest are those able to provide an innovative technology offset and/or cost calculus advantage. Our allies have made particular progress in the development of systems that offer a significant cost advantage in procurement or operation and reduce the amount of manpower necessary to effectively conduct operations. In addition, FCT will continue to seek out increased interoperability across platforms and systems. These technologies will be likely candidates for evaluation under the FCT program. ***FY 2017 Plans:*** During FY 2017, FCT will focus on selecting projects supporting the below Asymmetric Force Application and Autonomous System Areas: - Technologies to counter threats associated with integrated air defense systems - Technologies that enhance the ability to conduct long range penetrating strike - Offensive and defensive air superiority operations - Mobile unmanned systems that must maneuver in an environment with little or no human assistance - Systems that aid human cognitive tasks ***FY 2018 Plans:*** During FY 2018, FCT will focus on selecting projects supporting the below Asymmetric Force Application and Autonomous System Areas: - Technologies to counter threats associated with integrated air defense systems			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Office of the Secretary Of Defense		Date: May 2017
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603133D8Z / *Foreign Comparative Testing*	**Project (Number/Name)** P313 / *Foreign Comparative Testing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
- Technologies that enhance the ability to conduct long range penetrating strike - Offensive and defensive air superiority operations - Mobile unmanned systems that must maneuver in an environment with little or no human assistance - Systems that aid human cognitive tasks			
Title: Information Operations and Analytics and Spectrum Agility Focus Areas	-	2.323	6.484
Description: FCT will invest in cross-domain, innovative Information Operations and Analytics and Electromagnetic Spectrum Agility evaluations of new and emerging capabilities with international partners. Solutions will increase U.S. options for enhancing communications and situational awareness and allow the Department of Defense to operate with freedom of maneuver in the electromagnetic spectrum. ***FY 2017 Plans:*** During FY 2017, FCT will focus on selecting projects supporting the below Information Operations and Analytics and Electromagnetic Spectrum Agility Areas: - Provide the Joint Force enhanced communications and situational awareness within the area of responsibility to disrupt and delay adversary force from offensive operations - Counter adversary ability to use deceptive messaging to influence U.S. and Coalition operations - Develop capabilities to counter adversary cyber and command and control communications - Gaining and attaining access to spectrum for friendly forces, denying and/or degrading spectrum to our adversaries - Conducting Electromagnetic (EM) deception operations to degrade an adversary's understanding of our intent and capability - Preventing the adversary from leveraging the EM domain to conduct operations in other domains (i.e., air, space, maritime, land and cyber) - Achieving new effects in the electromagnetic spectrum domain to include directed energy and radio frequency disruption - Evaluating low-cost, efficient or innovative international capabilities ***FY 2018 Plans:*** During FY 2018, FCT will focus on selecting projects supporting the below Information Operations and Analytics and Electromagnetic Spectrum Agility Areas: - Provide the Joint Force enhanced communications and situational awareness within the Area of Responsibility to disrupt and delay adversary force from offensive operations - Counter adversary ability to use deceptive messaging to influence U.S. and Coalition operations - Develop capabilities to counter adversary cyber and command and control communications - Gaining and attaining access to spectrum for friendly forces, denying and/or degrading spectrum to our adversaries - Conducting Electromagnetic (EM) deception operations to degrade an adversary's understanding of our intent and capability			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Office of the Secretary Of Defense		Date: May 2017
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603133D8Z / *Foreign Comparative Testing*	**Project (Number/Name)** P313 / *Foreign Comparative Testing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
- Preventing the adversary from leveraging the EM domain to conduct operations in other domains (i.e., air, space, maritime, land and cyber) - Achieving new effects in the electromagnetic spectrum domain to include directed energy and radio frequency disruption - Evaluating low-cost, efficient or innovative international capabilities			
Title: Force Logistics Focus Areas ***Description:*** FCT will invest in cross-domain, innovative force logistic technologies for new and emerging capabilities with international partners, including but not limited to these Defense-wide requirements that are consistent with strategic priorities: reducing soldier load, interoperability across platforms and systems, and energy solutions. ***FY 2017 Plans:*** During FY 2017, FCT will focus on selecting projects supporting the below Force Logistics Areas: - Reducing soldier load reduces the weight currently sustained by the individual dismounted soldier, including materials that enable weight reduction to individual weapons, ammunition, or portable missile systems - Increasing interoperability across platforms and systems will invest into technologies for mission-based, on-demand routing, network, and information management, with a focus on command and control interoperability with coalition capabilities through integrated multi-level security enabled networks. Transition of Modular Open Systems Approach (MOSA) capabilities which are portable, modular, partitioned, scalable, extendable, and secure - Improving energy solutions will include power systems and electronics designed for extreme cold to support arctic strategy and renewable energy options that can reduce force support and logistics requirements ***FY 2018 Plans:*** During FY 2018, FCT will focus on selecting projects supporting the below Force Logistics Areas: - Reducing soldier load reduces the weight currently sustained by the individual dismounted soldier, including materials that enable weight reduction to individual weapons, ammunition, or portable missile systems - Increasing interoperability across platforms and systems will invest into technologies for mission-based on-demand routing, network, and information management, with a focus on command and control interoperability with coalition capabilities through integrated multi-level security enabled networks. Transition of MOSA capabilities which are portable, modular, partitioned, scalable, extendable, and secure - Improving energy solutions will include power systems and electronics designed for extreme cold to support arctic strategy and renewable energy options that can reduce force support and logistics requirements	-	1.549	4.135
Accomplishments/Planned Programs Subtotals	24.406	19.343	24.199

Exhibit R-2A, RDT&E Project Justification: FY 2018 Office of the Secretary Of Defense		Date: May 2017
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603133D8Z / *Foreign Comparative Testing*	**Project (Number/Name)** P313 / *Foreign Comparative Testing*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Successful FCT's can transition to acquisition via several ways: As a pre-engineering and manufacturing development prototype the item tested could be a technology upgrade insertion into a current platform or program providing greater capability or prolonging the life of the weapon system. If the item was a proof-of-principle prototype the testing results could lead to informed/refined requirements generation providing better outcome for current planned U.S. system or could lead to a direct transition/procurement should the item/article provide a new capability.

E. Performance Metrics

Strategic Goals Supported:
- Develop and Demonstrate Proof-of-Principle prototypes that fill capability gaps.
- Develop and Demonstrate Pre-EMD prototypes that address DoD strategic priorities.
- Develop and Demonstrate a prototype that informs/refines the acquisition process.

Measurable Outcomes:
- FCTs will demonstrate capability objectives within 24-36 months.
- In FY 2016, FCT had a transition rate of 88 percent for completed projects, exceeding the objective of 40 percent for demonstration programs.