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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy **Date:** May 2017

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>					R-1 Program Element (Number/Name) PE 0304240M I (U) <i>Advanced Tactical Unmanned Aircraft System</i>							
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	0.000	0.000	0.000	7.979	-	7.979	10.385	5.979	7.974	7.970	Continuing	Continuing
3135: <i>USMC MUX Medium Altitude - Long Endurance (MALE) Group 5 UAV</i>	0.000	0.000	0.000	4.978	-	4.978	5.485	5.979	7.974	7.970	Continuing	Continuing
3427: <i>KMAX Experimentation and Support</i>	0.000	0.000	0.000	3.001	-	3.001	4.900	0.000	0.000	0.000	0.000	7.901

A. Mission Description and Budget Item Justification

This is an FY18 new start for project units 3135 and 3427.

This program element provides for development and capability requirements for Advanced Tactical Unmanned Aerial Vehicles. Projects are Joint Military Intelligence Programs.

Project 3135 - This project provides for the early trade studies, analysis, experimentation, and concept refinement for the Marine Air Ground Task Force (MAGTF) Unmanned Aircraft System (UAS) Expeditionary (MUX) with Vertical/Short Take-Off and Vertical Landing (V/STOVL) capability. The MUX efforts will inform a future program of record.

Project 3427 - This project provides for experimentation and support of the CQ-24A Cargo UAS (commonly referred to as KMAX). CQ-24A will be used to specifically inform the unmanned cargo resupply requirements of future programs of record, to include MUX. Experimentation includes payloads/sensor integration, control station integration, Concept of Operations (CONOPS) and Tactics, Techniques, and Procedures (TTP) development. These experimentation efforts inform program capability documents and support other military exercises.

Cost estimate for Cost to Complete and Total Cost for both project units are being developed and will be promulgated in a future budget request.

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B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	7.979	-	7.979
Total Adjustments	0.000	0.000	7.979	-	7.979
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	0.000	0.000	7.978	-	7.978
• Rate/Misc Adjustments	0.000	0.000	0.001	-	0.001

Change Summary Explanation

Schedule:

Project 3135 - Establishes the MUX project unit.

Project 3427 - Establishes the CQ-24A Cargo UAS project unit.

Technical: Not applicable

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Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0304240M / (U)Advanced Tactical Unmanned Aircraft System				Project (Number/Name) 3135 / USMC MUX Medium Altitude - Long Endurance (MALE) Group 5 UAV			
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
3135: USMC MUX Medium Altitude - Long Endurance (MALE) Group 5 UAV	0.000	0.000	0.000	4.978	-	4.978	5.485	5.979	7.974	7.970	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Funding provides for the early trade studies, analysis, experimentation, and concept refinement for the Marine Air Ground Task Force (MAGTF) Unmanned Aircraft System (UAS) Expeditionary (MUX) with Vertical/Short Take-Off and Vertical Landing (V/STOVL) capability. The MUX system Initial Capabilities Document (ICD) was approved Oct 2016. The Material Development Decision and Analysis of Alternatives (AOA) is planned to start in FY18. The future MUX UAV system will provide a multi-mission, weaponized, shipboard capable/expeditionary system that is runway independent for all weather, long range/persistence, operations from the sea in a contested environment. This next generation UAV capability will have far greater range, endurance, altitude, and payload capability than the current conventional VTOL technology can provide from air capable ships.

This effort will inform program scope and phasing for development of the MUX capability that will be part of a future Program of Record (POR), supporting Expeditionary Force 21 Operating Concepts, as an advanced, multi-mission platform in support of a Marine Expeditionary Force/Marine Expeditionary Brigade-sized MAGTF and addressing future capability gaps.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: MUX Studies, Analysis, Experimentation and Concept Refinement	0.000	0.000	3.650	0.000	3.650
Articles:	-	-	-	-	-
FY 2016 Accomplishments: N/A					
FY 2017 Plans: N/A					
FY 2018 Base Plans: Provides funding for Government and industry teams for pre-Milestone A activities including industry inquiries, aircraft trade studies, concept refinement, requirements/payload analysis for meeting mission requirements to inform the MUX					

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
		FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p>POR. Supports development of the MUX Concept of Operations and draft Capability Development Document (CDD). Provides funding for experimentation with advanced concept demonstrator UAVs such as USMC CQ-24 Cargo UAS and DARPA/ONR developed Tactical Expeditionary Reconnaissance Node (TERN) Medium Altitude Long Endurance (MALE) UAS, along with other tactical UAV/payload/control station demonstrator efforts to help inform performance requirements, initial Key Performance Parameters (KPP), CONOPS, concepts, tactics, doctrine, and the future MUX program of record. Provides funding for engineering architecture assessments (aircraft and payloads) to establish specific areas the government will function as the systems integrator. This will inform a future POR in order to reduce life cycle costs.</p> <p>FY 2018 OCO Plans: N/A</p>						
<p>Title: Technical and Engineering Services</p> <p align="right">Articles:</p>		0.000	0.000	1.328	0.000	1.328
<p>FY 2016 Accomplishments: N/A</p> <p>FY 2017 Plans: N/A</p> <p>FY 2018 Base Plans: Initiate and provide Government Engineering support, Contractor support, Program support and travel for execution of MUX Studies, Experimentation, and Concept Refinement and for pre-MS A related acquisition activities to support the future MUX program of record.</p> <p>FY 2018 OCO Plans: N/A</p>		-	-	-	-	-
Accomplishments/Planned Programs Subtotals		0.000	0.000	4.978	0.000	4.978

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C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

A Material Development Decision is anticipated in FY18. The MUX program will leverage technology of unmanned tactical aviation programs, including DARPA/ONR concept demonstrator UAV S&T programs, OEM internally funded UAV prototypes when available, existing tactical unmanned technologies, and promising new industry design concepts that result from industry trade studies. The government will develop and award study contracts as required to support program activities and analysis efforts. Assessment of the technology base through industry inquiries and study contracts will be used to determine material solutions that are capable of meeting MUX requirements and Initial Operational Capability (IOC) needs. The MUX POR intends to have the Government functioning as the system integrator for the development and sustainment of the program to reduce life cycle costs - a business case analysis will help inform the level of government involvement required to maximize cost savings.

E. Performance Metrics

Performance metrics include successful completion of Trade Studies; successful development of a CONOPS and draft Capability Development Document, identification of material solutions for concept refinement, and analysis of architectures.

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Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0304240M I (U)Advanced Tactical Unmanned Aircraft System				Project (Number/Name) 3427 I KMAX Experimentation and Support			
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
3427: KMAX Experimentation and Support	0.000	0.000	0.000	3.001	-	3.001	4.900	0.000	0.000	0.000	0.000	7.901
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Funding provides for experimentation for unmanned cargo operations and includes complimentary Intelligence, Surveillance, and Reconnaissance (ISR), payloads, advanced sensors, autonomy; efforts to refine requirements and concept of operations (CONOPS); and support of future unmanned programs of record, such as Marine Air Ground Task Force (MAGTF) Unmanned Aircraft System (UAS) Expeditionary (MUX).

The CQ-24A Cargo UAS is a unique, unmanned, sling-load capable aircraft that has had demand signals including moving cargo in permissive environments (e.g. food, fuel, medicine), combatting forest fires, and flying to locations that present dangerous or deadly conditions to humans (such as biological threats or radiation hazards).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: CQ-24A Cargo UAS Experimentation and Support Services	0.000	0.000	2.091	0.000	2.091
Articles:	-	-	-	-	-
FY 2016 Accomplishments: N/A					
FY 2017 Plans: N/A					
FY 2018 Base Plans: Provides funding for government and industry teams to operate aircraft in support of tactics development and fleet experimentation and modify aircraft with payloads to support requirements refinement, to include MUX. Payloads may include sensors, weapons, and systems to support extended range operations. Provides funding for engineering architecture assessments (aircraft and payloads) to establish areas where the government will function as the systems integrator for a program of record, in order to reduce life cycle costs.					
FY 2018 OCO Plans: N/A					
Title: Technical and Engineering Services	0.000	0.000	0.910	0.000	0.910
Articles:	-	-	-	-	-

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<i>FY 2016 Accomplishments:</i> N/A					
<i>FY 2017 Plans:</i> N/A					
<i>FY 2018 Base Plans:</i> Initiate and provide government engineering support, contractor support, program support and travel for execution of CQ-24A Cargo UAS experimentation and concept refinement for study products and acquisition activities to support future programs of record, to include MUX.					
<i>FY 2018 OCO Plans:</i> N/A					
Accomplishments/Planned Programs Subtotals	0.000	0.000	3.001	0.000	3.001

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

The CQ-24A Cargo UAS experimentation and support activities will be contracted through a sole source contract with the aircraft prime vendor in order to support continued experimentation through FY19. It is envisioned that support will continue beyond FY18/FY19 to align with the MUX program of record concept refinement phase.

E. Performance Metrics

Performance metrics include successful completion of technical demonstration with published reports and CONOPS updates, along with inputs to unmanned cargo re-supply requirements for capability documents and performance specifications.