Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy											Date: February 2020	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0304240M *I (U)Advanced Tactical Unmanned Aircraft System*							
COST ($ in Millions)	**Prior Years**	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
Total Program Element	5.200	17.554	45.407	22.589	-	22.589	27.063	63.451	63.028	64.288	Continuing	Continuing
3135: *USMC MUX Medium Altitude - Long Endurance (MALE) Group 5 UAV*	4.978	12.708	12.907	22.589	-	22.589	27.063	63.451	63.028	64.288	Continuing	Continuing
3427: *KMAX Experimentation and Support*	0.222	4.846	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	5.068
9999: *Congressional Adds*	0.000	0.000	32.500	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	32.500

A. Mission Description and Budget Item Justification

This program element provides for development and capability requirements for Advanced Tactical Unmanned Aerial Vehicles in support of expeditionary efforts.

Project 3135 - This project provides technical concept maturation and prototyping 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 allowing for runway independence. MUX is determined to be a critical capability for current and future USMC expeditionary operations. These MUX efforts will include refinement of program requirements and Concept of Operations (CONOPS), modeling and simulation of mission payloads with minimized Space, Weight, Power, and Cooling (SWaP-C), development of system architectures, development of air vehicle concepts, development of a Common Control Station (CCS) compliant Mission Control Station, and modeling and simulation of various air vehicle designs that would lead to rapid prototyping of a Minimum Viable Product (MVP) to inform a future MUX program of record. Resulting work products will mitigate technical risks through analysis, modeling and simulation matched with refined CONOPS development, industry payload, air vehicle concepts, CCS compliant MCS roadmap, and will leverage real-time data used on deployed USMC MQ-9 and USN M-8B/C. Threshold prototype capabilities will include; Airborne Early Warning, Intelligence Surveillance Reconnaissance (ISR), Electronic Warfare (EW) and Communications/Data Relay-Control (DR). Provides USMC with MUX MVP aircraft capability when prototype funding is available.

Project 3427 - This project provides experimentation and support of the CQ-24A Cargo UAS (commonly referred to as KMAX), which was used for experimentation to inform the unmanned cargo resupply requirements of future programs of record to include MUX and unmanned logistics system-air, ULS-A. Experimentation includes payloads/sensor integration, control station integration, CONOPS and Tactics, Techniques, and Procedures (TTP) development. The experimentation efforts informed program capability documents, supports military demonstrations, and advance technologies. This program allows for government, industry teams, and other stakeholders to collaboratively develop key sensor technologies for obstacle avoidance on future unmanned and manned aircraft. These efforts include continued development of autonomous obstacle avoidance systems that have dual military-commercial use, such as natural disaster response, combatting wild fires, and enabling cargo delivery in austere environments.

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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy	Date: February 2020
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0304240M *I (U)Advanced Tactical Unmanned Aircraft System*

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	17.561	21.157	26.649	-	26.649
Current President's Budget	17.554	45.407	22.589	-	22.589
Total Adjustments	-0.007	24.250	-4.060	-	-4.060
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-8.250			
• Congressional Rescissions	-	-			
• Congressional Adds	-	32.500			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.007	0.000			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	0.000	0.000	-4.152	-	-4.152
• Rate/Misc Adjustments	0.000	0.000	0.092	-	0.092

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2019	FY 2020
Project: 9999: *Congressional Adds*		
Congressional Add: *Mobile unmanned/manned distributed lethality airborne network and fused integrat*	0.000	14.000
Congressional Add: *Large unmanned logistics systems air development*	0.000	18.500
Congressional Add Subtotals for Project: 9999	0.000	32.500
Congressional Add Totals for all Projects	0.000	32.500

Change Summary Explanation

Schedule:

Project 3135 - Updated to reflect Program Acquisition Strategy, which includes use of Prize Challenge to refine MUX requirements and validate capability performance in a laboratory. Additional program technical analysis will be conducted with, but not limited to software, scientific and technology solutions that help achieve program/service missions. This update also includes changes to Modeling and Simulation, and Test & Evaluation requirements.

The FY 2021 funding request was reduced by $4.152 million to account for the availability of prior year execution balances.

Project 3427 - Not applicable

Technical: Not applicable

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
3135: *USMC MUX Medium Altitude - Long Endurance (MALE) Group 5 UAV*	4.978	12.708	12.907	22.589	-	22.589	27.063	63.451	63.028	64.288	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Funding provides for the development of system architectures, development of air vehicle concepts, development of a CCS compliant Mission Control Station, experimentation, key technology maturation, 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 UAV supports Expeditionary Force 21 Operating Concepts , the 2017 Marine Aviation Plan (AvPlan), US Military Strategy, and the US Maritime Strategy which require an advanced, multi-mission ship-based Group 5 UAS in support of Marine Expeditionary Force/Marine Expeditionary Brigade-sized MAGTF to address capability gaps. The future MUX UAV system will provide a weaponized, payload flexible, 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 Vertical Take Off and Landing (VTOL) technology can provide from air capable ships. The MUX system Initial Capabilities Document (ICD) was approved in Oct 2016.

This effort will continue to refine program scope, phasing, and cost for development of the MUX capability. The funds will allow for data analysis in the MUX lab. FY22 funds the evaluation of the air vehicle data through model based systems engineering, as well as continuing lab-based simulation with data supplied by the payload and air vehicle prize challenges. Additional efforts will support the initiation of rapid prototyping with engineering analysis, program management, and sustainment planning. The program will continue leveraging other technology developmental programs, such as developmental communications/networking payloads capabilities, and USMC MQ-9 and USN MQ8, allowing for continued technical maturation effort, rapid prototyping, and effective transition to a MUX POR.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: MUX Studies, Analysis, and Concept Refinement	10.068	7.005	13.549	0.000	13.549
Articles:	-	-	-	-	-
FY 2020 Plans: Planned efforts include continued development of system architecture focusing on the air vehicle, model based system engineering from payload prize challenges to assess and develop a design system architecture. Validate CONOPS requirement documentation to support future design development, and rapid prototyping efforts. Supports refinement of the MUX concept through wargame simulation and analysis. Conduct lab-based simulation with payloads and control station data supplied by the payload prize challenges to refine tactical					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
unmanned system Performance Parameters, tactics, and support follow-on rapid prototyping. Continue program support for the second prize challenge and program document development. ***FY 2021 Base Plans:*** Planned efforts include evaluation of the air vehicle design through engineering analysis, continued CONOPs refinement, modeling & simulation using payloads prize challenge data. Continue lab-based simulation with data obtained through completed prize challenges. Additional efforts will support prototyping concepts with engineering analysis, program management, and sustainment planning. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase due to commencement of prototype development and to evaluate the air vehicle prize challenge data.					
Title: Test, Technical, Engineering and Management Services	2.640	5.902	9.040	0.000	9.040
Articles:	-	-	-	-	-
FY 2020 Plans: Provide Government Engineering support, Contractor support, Program support and travel for execution of MUX studies, experimentation, rapid prototyping, and concept refinement and related acquisition activities to support a future MUX program of record. MUX architecture development, component-level prototyping, modeling & simulation, and analysis of data provided by DOD developmental programs. ***FY 2021 Base Plans:*** Provide Government Engineering support, Contractor VTOL - applicable, support, Program support and travel for execution of MUX concept development. Efforts include modeling and simulation of prize challenge data, evaluation of air vehicle data and development of prototype contract requirements. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase in engineering support required to evaluate the air vehicle prize challenge data and preparation for prototype contract actions.					
Accomplishments/Planned Programs Subtotals	12.708	12.907	22.589	0.000	22.589

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The MUX will utilize a Prize Challenge and other transactional authorities concept to promote competition and innovative concepts focused on system architecture, payloads, and air vehicle concepts. These efforts will be assessed through model based system engineering evaluations. Lab-based simulation will be used to refine tactical unmanned system Performance Parameters, tactics, and support potential follow-on rapid prototyping. Additionally, the program will leverage other technology developmental programs, such as developmental communications/networking payloads capabilities.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
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*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MUX Studies and Experimentation	Various	TBD : TBD	1.500	8.045	Nov 2018	1.734	Nov 2019	2.170	Nov 2020	-		2.170	Continuing	Continuing	Continuing
Requirements Analysis and Engineering Assessments	WR	Various : Various	2.150	2.023	Nov 2018	0.960	Nov 2019	1.991	Nov 2020	-		1.991	Continuing	Continuing	Continuing
Prototype Development	Various	NAWCAD : Patuxent River, MD	0.000	0.000		0.000		5.428	Nov 2020	-		5.428	0.000	5.428	-
Prize Challenge Award	Various	Various : Various	0.000	0.000		4.000	Nov 2019	0.000		-		0.000	0.000	4.000	-
Modeling and Simulation	Various	NAWAD : Patuxent River, MD	0.000	0.000		0.311	Nov 2019	3.960	Nov 2020	-		3.960	0.000	4.271	-
		Subtotal	3.650	10.068		7.005		13.549		-		13.549	Continuing	Continuing	N/A

Remarks

Increases from FY20 to FY21 reflects changes in acquisition strategy utilizing a Prize Challenge and Rapid Prototyping Concept requiring additional technical effort.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test & Evaluation	Various	NAWCAD : Patuxent River, MD	0.000	0.000	Dec 2018	0.220	Nov 2019	1.100	Nov 2020	-		1.100	0.000	1.320	-
		Subtotal	0.000	0.000		0.220		1.100		-		1.100	0.000	1.320	N/A

Remarks

Increase from FY20 to FY21 reflect use of capabilities based testing to be planned and implemented in a lab environment.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Engineering Support	WR	NAWCAD : Patuxent River, MD	0.635	1.252	Nov 2018	2.377	Nov 2019	4.896	Nov 2020	-		4.896	0.000	9.160	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
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*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	Various	Various : Various	0.600	1.268	Nov 2018	3.119	Nov 2019	2.554	Nov 2020	-		2.554	0.000	7.541	-
Travel	WR	NAWCAD : Patuxent River, MD	0.093	0.120	Nov 2018	0.186	Nov 2019	0.490	Nov 2020	-		0.490	0.000	0.889	-
		Subtotal	1.328	2.640		5.682		7.940		-		7.940	0.000	17.590	N/A

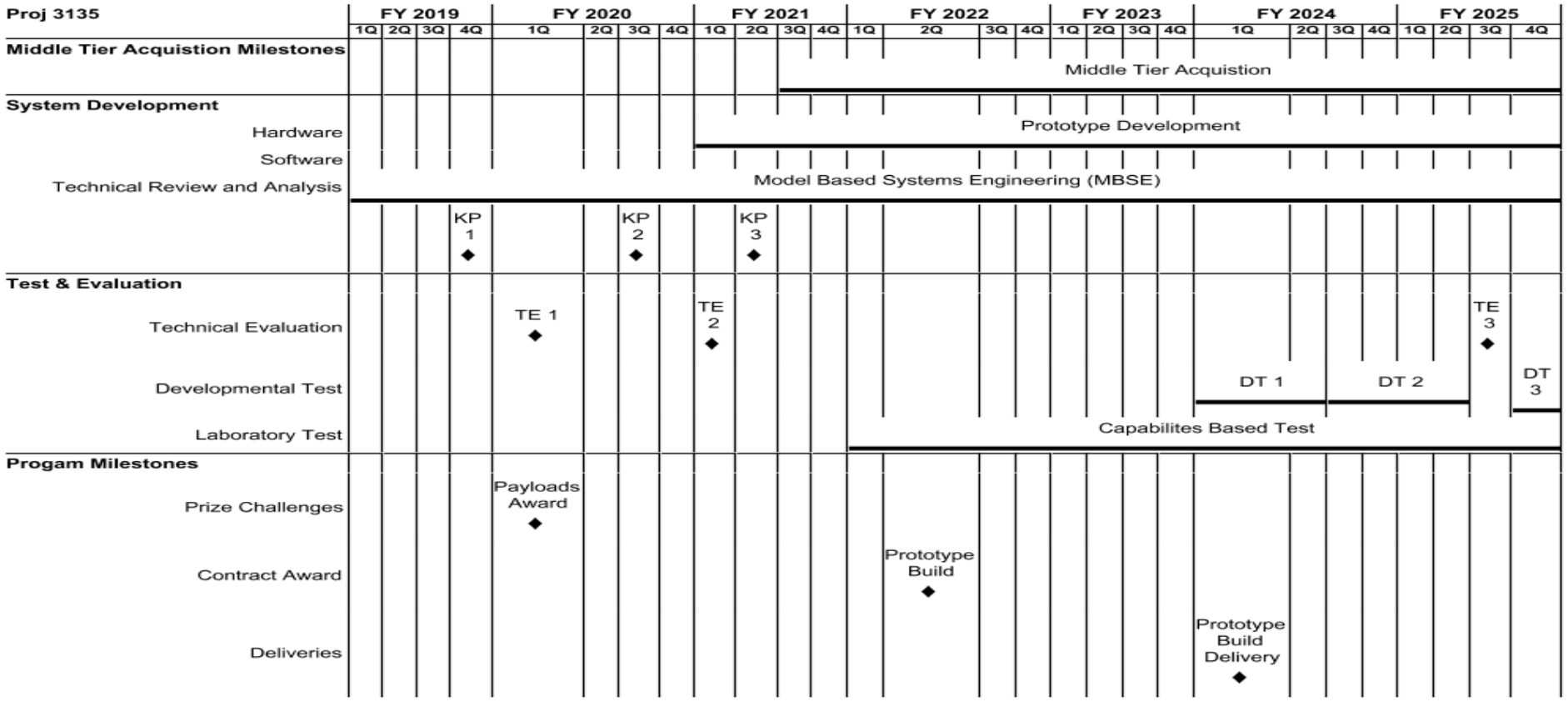
Remarks

Increases from FY20 to FY21 due to engineering and program management effort to support Prize Challenge evaluation, additional engineering to support simulation using vendor data, additional program management for prototype contract development and increased travel to support technical and programmatic meetings.

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	4.978	12.708		12.907		22.589		-		22.589	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
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*



2021PB - 0304240M - 3135

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
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*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3135				
Middle Tier Acquistion Milestones: Middle Tier Acquistion	3	2021	4	2025
System Development: Hardware: Prototype Development	1	2021	4	2025
System Development: Technical Review and Analysis: Model Based Systems Engineering (MBSE)	1	2019	4	2025
System Development: Technical Review and Analysis: Knowledge Point (KP) 1	4	2019	4	2019
System Development: Technical Review and Analysis: Knowledge Point (KP) 2	3	2020	3	2020
System Development: Technical Review and Analysis: Knowledge Point (KP) 3	2	2021	2	2021
Test & Evaluation: Technical Evaluation: Technical Evaluation (TE) 1	1	2020	1	2020
Test & Evaluation: Technical Evaluation: Technical Evaluation (TE) 2	1	2021	1	2021
Test & Evaluation: Technical Evaluation: Technical Evaluation (TE) 3	3	2025	3	2025
Test & Evaluation: Developmental Test: Developmental Test (DT)	1	2024	2	2024
Test & Evaluation: Developmental Test: Developmental Test (DT) 2	3	2024	2	2025
Test & Evaluation: Developmental Test: Developmental Test (DT) 3	4	2025	4	2025
Test & Evaluation: Laboratory Test: Capabilites Based Test	1	2022	4	2025
Progam Milestones: Prize Challenges: Payloads Award	1	2020	1	2020
Progam Milestones: Contract Award: Prototype Build	2	2022	2	2022
Progam Milestones: Deliveries: Prototype Build Delivery	1	2024	1	2024

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0304240M / *(U)Advanced Tactical Unmanned Aircraft System*	Project (Number/Name) 3427 / *KMAX Experimentation and Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
3427: *KMAX Experimentation and Support*	0.222	4.846	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	5.068
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Funding provided for experimentation for unmanned cargo operations and includes complementary collision avoidance, payloads, advanced sensors, autonomy; efforts refined requirements and Concept of Operations (CONOPS); and support of future unmanned programs of record. Funding supported government and industry teams to develop key sensor technologies needed for future VTOL aircraft. This included continued development of autonomous obstacle avoidance and landing systems for dual military-commercial use, such as natural disaster response and combatting wild fires, allowing for cargo delivery in austere environments. Additionally, funding supported the continued development and integration of unique satellite communication systems designed for over-the-horizon use and operation in line-of-sight constrained environments. The combined capability will be demonstrated on the CQ-24A.

Currently, there is no additional funding planned for KMAX Experimentation and Support (PU 3427) through the FYDP.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: CQ-24A Cargo UAS Experimentation and Support Services	4.605	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2020 Plans: N/A					
FY 2021 Base Plans: N/A					
FY 2021 OCO Plans: N/A					
Title: Technical and Engineering Services	0.241	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2020 Plans: N/A					
FY 2021 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0304240M / *(U)Advanced Tactical Unmanned Aircraft System*	**Project (Number/Name)** 3427 / *KMAX Experimentation and Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Test component and system level payloads as they relate to unmanned air vehicle performance. Analyze test data and operational effectiveness. Develop CONOPS and tactics, techniques, and procedures for future unmanned military or civilian use. ***FY 2021 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	4.846	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The CQ-24A Cargo UAS experimentation and support activities were contracted through a sole source contract with the aircraft prime vendor and through other contracts to sensor/communication vendors that are currently developing the AACUS and SATCOM capabilities for NAVAIR, including the use of small business.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0304240M / *(U)Advanced Tactical Unmanned Aircraft System*	**Project (Number/Name)** 3427 / *KMAX Experimentation and Support*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CQ-24A Cargo UAS Experimentation	Various	USAF : Rome, NY	0.222	4.553	Apr 2019	0.000		0.000		-		0.000	0.000	4.775	4.750
Requirements and Analysis, and Engineering Assessments	WR	NAWCAD : Patuxent River, MD	0.000	0.052	May 2019	0.000		0.000		-		0.000	0.000	0.052	1.190
		Subtotal	0.222	4.605		0.000		0.000		-		0.000	0.000	4.827	N/A

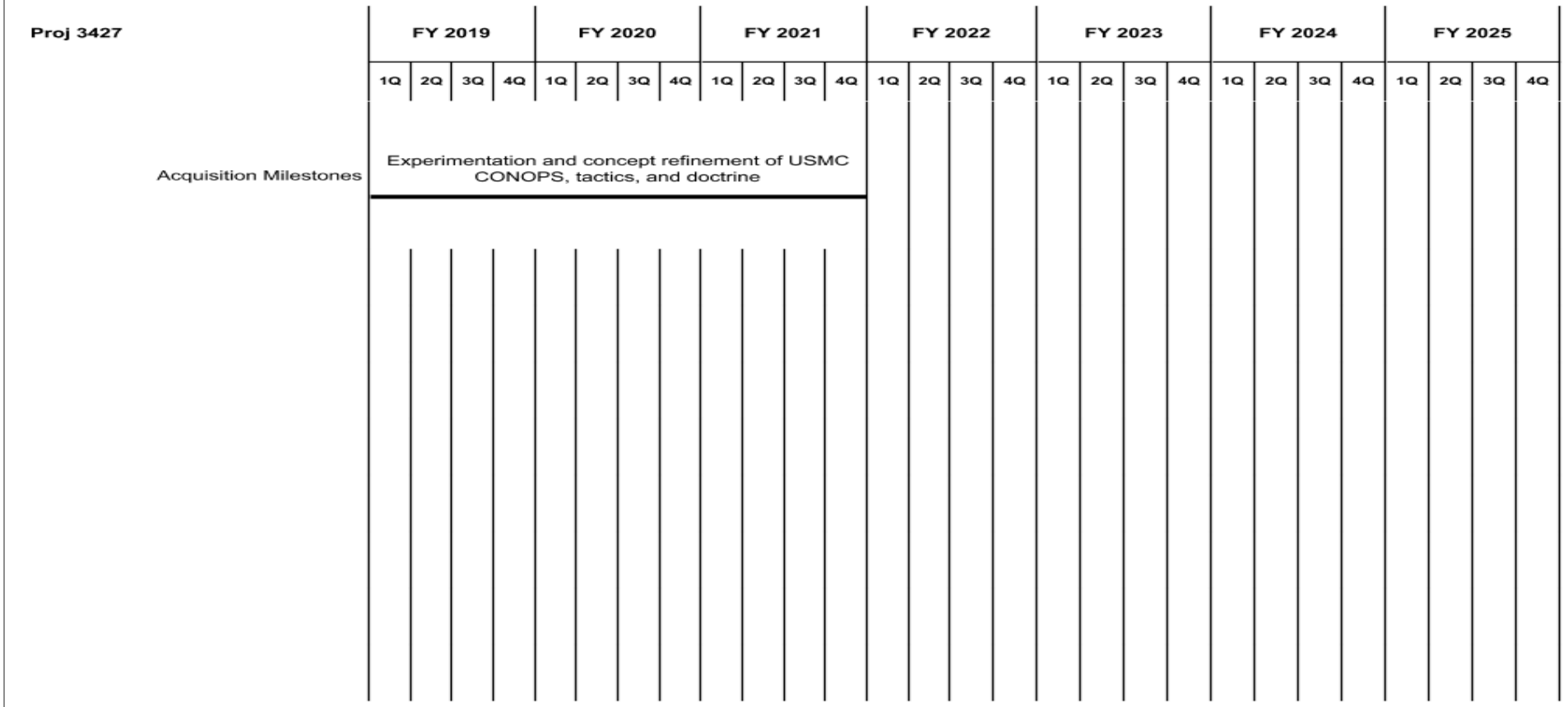
Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Govt Engineering Support	WR	FRC : Cherry Point, NC	0.000	0.241	Feb 2019	0.000		0.000		-		0.000	0.000	0.241	-
		Subtotal	0.000	0.241		0.000		0.000		-		0.000	0.000	0.241	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.222	4.846		0.000		0.000		-		0.000	0.000	5.068	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0304240M / *(U)Advanced Tactical Unmanned Aircraft System*	**Project (Number/Name)** 3427 / *KMAX Experimentation and Support*



2021DON - 0304240M - 3427

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0304240M / *(U)Advanced Tactical Unmanned Aircraft System*	**Project (Number/Name)** 3427 / *KMAX Experimentation and Support*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3427				
Acquisition Milestones: Experimentation and concept refinement of USMC CONOPS, tactics, and doctrine	1	2019	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0304240M / *(U)Advanced Tactical Unmanned Aircraft System*	Project (Number/Name) 9999 / *Congressional Adds*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
9999: *Congressional Adds*	0.000	0.000	32.500	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	32.500
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project C553 - Manned-Unmanned Distributed Lethality Airborne Network (MUDLAN) provides prototype development, testing, fleet experimentation, and concept refinement for next generation high speed ISR data link to connect and distribute multi-users / multi domains with 5G like speeds.
The modern protected communications capabilities allow manned and unmanned aircraft to share and disseminate large amounts of data using improved emergent communications technologies for multi-platform/ multi-service interoperability through Line-of-Sight (LOS) tactical data networks. These high-speed tactical data links are required at the forward edge where satellite services are not optimal and where existing airborne tactical data links do not support 4G and 5G wireless speeds. Additionally, the funding supports USMC Fused Integrated Naval Network (FINN), which is leveraging the new MUDLAN technology for Navy-USMC tactical data link interoperability. MUDLAN also supports Navy's Distributed Maritime Operations (DMO) objectives as a key enabler for communications and dissemination.

Project C554 - Unmanned Logistics Support - Air (ULS-A) provides for experimentation for unmanned cargo operations and includes complementary Intelligence, Surveillance, and Reconnaissance (ISR), payloads, advanced sensors, autonomy; efforts refined requirements and concept of operations (CONOPS). This includes continued development of autonomous obstacle avoidance and landing system, and the continued development and integration of unique satellite communication systems designed for over-the-horizon use and operation in line-of-sight constrained environments.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020
Congressional Add: Mobile unmanned/manned distributed lethality airborne network and fused integrat ***FY 2019 Accomplishments:*** N/A ***FY 2020 Plans:*** N/A	0.000	14.000
Congressional Add: Large unmanned logistics systems air development ***FY 2019 Accomplishments:*** N/A ***FY 2020 Plans:*** N/A	0.000	18.500
Congressional Adds Subtotals	0.000	32.500

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0304240M / *(U)Advanced Tactical Unmanned Aircraft System*	**Project (Number/Name)** 9999 / *Congressional Adds*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

The MUDLAN/FINN experimentation will leverage MUDLAN JCTD and MUDLAN SBIR prior efforts. The the use of Small Business contractors,the effort will focus on continued innovation of antenna, radio and networking capabilities. Experimentation and maturation will continue to inform end user operational requirements and build on USMC, Joint service, OSD(R&E) successes. Transition will occur through future acquisition plans once the hardware is mature and the Joint service requirements are validated to enable follow-on fleet integration.

The ULS-A demonstration will be combined with the current unmanned logistics capability and will support planned demonstrations associated with CQ-24A as part of a Cooperative Research and Development Agreement (CRADA) between the Navy and industry partners.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0304240M / *(U)Advanced Tactical Unmanned Aircraft System*	**Project (Number/Name)** 9999 / *Congressional Adds*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CONOPS, Interface Control Documents	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.500	Feb 2020	0.000		-		0.000	0.000	0.500	-
MUDLAN FINN Pod development and flight demonstration	C/FPIF	Various : Various	0.000	0.000		5.200	Mar 2020	0.000		-		0.000	0.000	5.200	-
MUDLAN communications equipment and demonstrations	C/CPIF	Various : Various	0.000	0.000		4.900	Mar 2020	0.000		-		0.000	0.000	4.900	-
ULS-A Experimentation	Various	USAF : Rome, NY	0.000	0.000		12.572	Apr 2020	0.000		-		0.000	0.000	12.572	-
ULS-A Requirements and analysis, and engineering assessements	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.750	Feb 2020	0.000		-		0.000	0.000	0.750	-
ULS-A GFE	MIPR	NSWC : Crane, IN	0.000	0.000		2.360	Mar 2020	0.000		-		0.000	0.000	2.360	-
		Subtotal	0.000	0.000		26.282		0.000		-		0.000	0.000	26.282	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Logistics Support	Various	Various : Various	0.000	0.000		1.200	Apr 2020	0.000		-		0.000	0.000	1.200	-
		Subtotal	0.000	0.000		1.200		0.000		-		0.000	0.000	1.200	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Range Demo Costs	Various	Various : Patuxent River, MD	0.000	0.000		2.100	Mar 2020	0.000		-		0.000	0.000	2.100	-
SAIL Cost	Various	Various : Patuxent River, MD	0.000	0.000		0.500	Apr 2020	0.000		-		0.000	0.000	0.500	-
		Subtotal	0.000	0.000		2.600		0.000		-		0.000	0.000	2.600	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0304240M / *(U)Advanced Tactical Unmanned Aircraft System*	Project (Number/Name) 9999 / *Congressional Adds*	

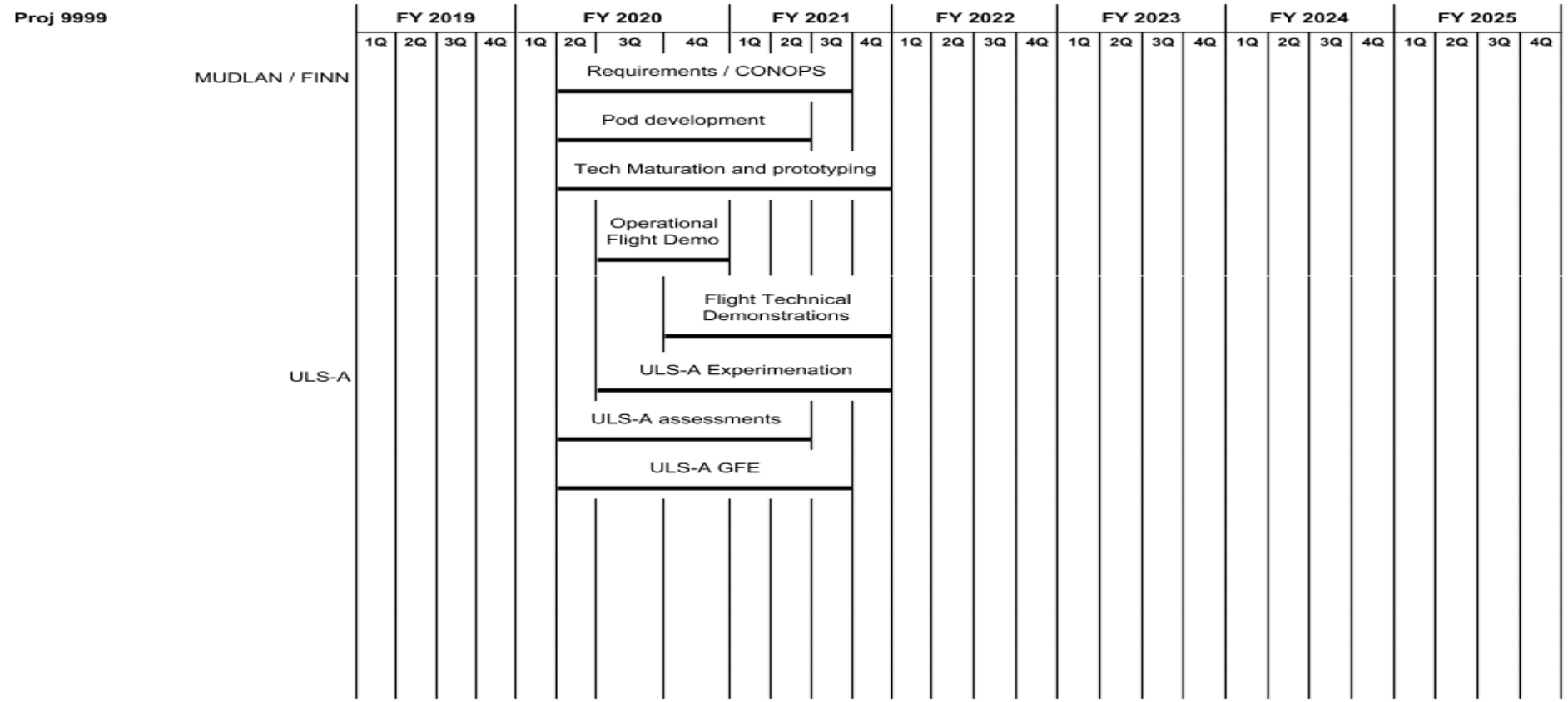
Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	Various	Various : Various	0.000	0.000		0.800	Feb 2020	0.000		-		0.000	0.000	0.800	-
Government Engineering Support	WR	NAWCAD : Patuxent River, MD	0.000	0.000		1.468	Feb 2020	0.000		-		0.000	0.000	1.468	-
Travel	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.150	Feb 2020	0.000		-		0.000	0.000	0.150	-
		Subtotal	0.000	0.000		2.418		0.000		-		0.000	0.000	2.418	N/A

	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		32.500		0.000		-		0.000	0.000	32.500	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0304240M / *(U)Advanced Tactical Unmanned Aircraft System*	**Project (Number/Name)** 9999 / *Congressional Adds*



2021PB - 0304240M - 9999

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0304240M / *(U)Advanced Tactical Unmanned Aircraft System*	**Project (Number/Name)** 9999 / *Congressional Adds*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 9999				
MUDLAN / FINN: Requirements / CONOPS	2	2020	3	2021
MUDLAN / FINN: MUDLAN FINN Pod development	2	2020	2	2021
MUDLAN / FINN: Maturation and prototyping of key MUDLAN communications equipment and demonstrations	2	2020	4	2021
MUDLAN / FINN: MUDLAN FINN Operational Flight Demo	3	2020	4	2020
MUDLAN / FINN: MUDLAN Flight Technical Demonstrations	4	2020	4	2021
ULS-A: ULS-A Product Development	3	2020	4	2021
ULS-A: ULS-A Requirements and Engineering Assessments	2	2020	2	2021
ULS-A: ULS-A GFE	2	2020	3	2021