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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Navy **Date:** May 2021

<b>Appropriation/Budget Activity</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy / BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603128N / <i>Unmanned Aerial System</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	0.000	0.000	0.000	16.879	-	16.879	-	-	-	-	-	-
3448: <i>Marine Group 5 UAS Development</i>	0.000	0.000	0.000	16.879	-	16.879	-	-	-	-	-	-

**Note**

The MALE program, PE 0603128N, is a continuation of the MUX FoS program initiated under PE 0304240M, (U) Advanced Tactical Unmanned Aircraft System. Funding in FY22 will continue to address capability gaps identified in the October 2016 MUX ICD and associated Requirements Clarification document.

**A. Mission Description and Budget Item Justification**

Project 3448 - The first Marine Air Ground Task Force (MAGTF) Unmanned Aircraft System (UAS) Expeditionary (MUX) Family of Systems (FoS) element is Medium-Altitude, Long-Endurance (MALE), a land-based Group 5 UAS based on the MQ-9A Block 5 weapon system. MALE is the number two service priority for the USMC and is scheduled for Early Operation Capability (EOC) in FY23.

MALE provides Advanced Tactical Unmanned Aerial Systems in support of Expeditionary Advanced Base Operations (EABO), Littoral Operations in Contested Environments (LOCE), and Distributed Maritime Operations (DMO) and an advanced, unmanned, multi-mission capability for the MAGTF and Marine Littoral Regiment.

MALE will pursue a discrete Airborne Early Warning (AEW) & Anti Surface Warfare (ASuW) sensor Acquisition Strategy, award contracts for sensor selection, technical requirements generation, conduct initial MQ-9A Block 5 integration studies, and maintain and operate air vehicle test assets. Prioritized mission sets are: Airborne Communications and Data Relay; Airborne Early Warning (AEW); Intelligence, Surveillance, Reconnaissance (ISR); and Electronic Warfare (EW). MALE supports national and Naval-networked command and control of U.S. forces across all warfighting domains in future contested operating environments, enhances situational awareness, expands sensor over watch capacity, enables expansion of the monitored operational area around naval forces, and enhances survivability.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Navy	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy / BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603128N / <i>Unmanned Aerial System</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	16.879	-	16.879
Total Adjustments	0.000	0.000	16.879	-	16.879
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	0.000	0.000	17.000	-	17.000
• Rate/Misc Adjustments	0.000	0.000	-0.121	-	-0.121

**Change Summary Explanation**

Project 3448 - FY22 funding continues work initiated under PE 0304240M and reflects funding transferred from PE 0304240M to this PE to address capability gaps identified in the October 2016 MUX ICD and associated Requirements Clarification document. FY22 funding was reduced by \$0.121 due to miscellaneous rate adjustments.

Technical: Not applicable.

Schedule: Not applicable.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603128N / Unmanned Aerial System				Project (Number/Name) 3448 / Marine Group 5 UAS Development			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
3448: Marine Group 5 UAS Development	0.000	0.000	0.000	16.879	-	16.879	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

Note: The MUX MALE program, PE 0603128N, is a continuation of the MUX FoS program initiated under PE 0304240M, (U) Advanced Tactical Unmanned Aircraft System. Funding starting in FY22 will enable MUX- MALE to address capability gaps identified in the October 2016 MUX ICD and associated Requirements Clarification document.

Project 3448 - The first Marine Air Ground Task Force (MAGTF) Unmanned Aircraft System (UAS) Expeditionary (MUX) Family of Systems (FoS) element is MUX Medium-Altitude, Long-Endurance (MUX MALE), a land-based Group 5 UAS based on the MQ-9A weapon system. MUX MALE is the number two service priority for the USMC and is scheduled for EOC in FY23.

MUX MALE provides Advanced Tactical Unmanned Aerial Systems in support of Expeditionary Advanced Base Operations (EABO), Littoral Operations in Contested Environments (LOCE), and Distributed Maritime Operations (DMO) and an advanced, unmanned, multi-mission capability for the MAGTF and Marine Littoral Regiment.

MUX MALE will pursue a discrete AEW & ASuW sensor Acquisition Strategy, award contracts with industry for sensor selection, technical requirements generation, conduct initial MQ-9A integration studies, and maintain and operate air vehicle test assets. Prioritized mission sets are: Airborne Communications and Data Relay; Airborne Early Warning (AEW); Intelligence, Surveillance, Reconnaissance (ISR); and Electronic Warfare (EW). MUX MALE supports national and Naval-networked command and control of U.S. forces across all warfighting domains in future contested operating environments, enhances situational awareness, expands sensor over watch capacity, enables expansion of the monitored operational area around naval forces, and enhances survivability.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<b>Title:</b> MALE Development	0.000	0.000	16.879	0.000	16.879
<b>Articles:</b>	-	-	-	-	-
<b>Description:</b> Funding supports the development and testing of mission system payloads supporting medium altitude long endurance concept identified within the MUX Initial Capabilities Document (ICD).					
<b>FY 2021 Plans:</b> N/A					
<b>FY 2022 Base Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Navy		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603128N / <i>Unmanned Aerial System</i>	<b>Project (Number/Name)</b> 3448 / <i>Marine Group 5 UAS Development</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
MUX MALE will pursue a discrete AEW & ASuW sensor Acquisition Strategy, award contracts for sensor selection, technical requirements generation, conduct initial MQ-9A Block 5 integration studies, and maintain and operate air vehicle test assets.  <b>FY 2022 OCO Plans:</b> N/A  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY22 funding continues work initiated under PE 0304240M and reflects funding transferred from PE 0304240M to this PE to will enable MUX MALE to address capability gaps identified in the October 2016 MUX ICD and associated Requirements Clarification document.					
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	0.000	16.879	0.000	16.879

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• APN/0452: <i>Marine Group 5 UAS (MALE)</i>	0.000	0.000	233.686	-	233.686	-	-	-	-	-	-
• APN/0507: <i>Marine Group 5 UAS (MALE) Mods</i>	0.000	0.000	1.982	-	1.982	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

MUX MALE AEW & ASuW sensor acquisition strategy is pre-decisional pending determination of an optimal approach to meet future desired fielding.  
Phase I: sensor selection, initial integration study, technical requirements generation  
Phase II: prototype design, development, and test  
The MUX MALE project will use organic government resources, competitive and sole contract awards, Other Transaction Authorities, and other innovative acquisition concepts. The program will identify and leverage existing developmental programs wherever possible.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603128N / <i>Unmanned Aerial System</i>	<b>Project (Number/Name)</b> 3448 / <i>Marine Group 5 UAS Development</i>
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Primary Development (Hardware/Software) Sensor CFE/GFE	TBD	Various : Various	0.000	0.000		0.000		6.897	Mar 2022	-		6.897	-	-	-
Sensor Integration	TBD	Various : Various	0.000	0.000		0.000		3.207	Dec 2021	-		3.207	-	-	-
<b>Subtotal</b>			0.000	0.000		0.000		10.104		-		10.104	-	-	N/A

**Remarks**  
Product development supports the hardware development and integration of MUX MALE payloads with the MQ-9A weapon system.

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Development Support	Various	Various : Various	0.000	0.000		0.000		1.500	Nov 2021	-		1.500	-	-	-
Engineering Support	Various	Various : Various	0.000	0.000		0.000		1.500	Nov 2021	-		1.500	-	-	-
<b>Subtotal</b>			0.000	0.000		0.000		3.000		-		3.000	-	-	N/A

**Remarks**  
Development and engineering costs support prime vendor as well as other qualified vendors associated with overall systems development for air vehicle and sensor packages. Includes costs to operate and sustain an MQ-9A test air vehicle and conduct developmental and operational test and evaluation support and test activities.

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Component Level Testing	WR	Various : Various	0.000	0.000		0.000		0.712	Jun 2022	-		0.712	-	-	-
<b>Subtotal</b>			0.000	0.000		0.000		0.712		-		0.712	-	-	N/A

**Remarks**  
Funds support required system level testing for the development of mission system payloads.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy** **Date:** May 2021

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<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Gov Engineering, Logistics, Program Management	C/BA	Not Specified : Not Specified	0.000	0.000		0.000		3.063	Nov 2021	-		3.063	-	-	-
<b>Subtotal</b>			0.000	0.000		0.000		3.063		-		3.063	-	-	N/A

**Remarks**  
Government and contractor support costs associated with management of the MALE Mission Sensors development and integration efforts.

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	0.000	0.000	0.000	16.879	-	16.879	-	-	N/A

**Remarks**

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603128N / <i>Unmanned Aerial System</i>	<b>Project (Number/Name)</b> 3448 / <i>Marine Group 5 UAS Development</i>
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Proj 3448	FY 2020				FY 2021				FY 2022				
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	
System Development Activites									<div style="border: 1px solid black; padding: 2px; margin: 2px;">Sensor Spiral Development</div> <hr style="border: 1px solid black;"/>				
Test and Evaluation Activities									<div style="border: 1px solid black; padding: 2px; margin: 2px;">Sensor Integration (Multiple Sensors)</div> <hr style="border: 1px solid black;"/>				
Production Milestones											<div style="border: 1px solid black; padding: 2px; margin: 2px;">Payload Testing</div> <hr style="border: 1px solid black;"/>		

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Navy		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603128N / <i>Unmanned Aerial System</i>	<b>Project (Number/Name)</b> 3448 / <i>Marine Group 5 UAS Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Proj 3448</i></b>				
System Development Activites: Sensor Spiral Development	2	2022	4	2022
System Development Activites: Sensor Integration	1	2022	4	2022
Test and Evaluation Activities: System level component testing	3	2022	4	2022