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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Navy **Date:** March 2023

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604636N / <i>Counter Unmanned Aircraft System (C-UAS)</i>
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	5.548	5.462	7.438	11.567	-	11.567	14.396	14.494	8.261	8.427	Continuing	Continuing
2073: <i>DRAKE 2.0 C-UAS Afloat</i>	0.000	0.000	6.018	10.194	-	10.194	12.731	12.922	6.910	7.050	Continuing	Continuing
3241: <i>Counter Unmanned Aircraft Systems (C-UAS)</i>	5.548	5.462	1.420	1.373	-	1.373	1.665	1.572	1.351	1.377	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Counter Unmanned Aircraft System (C-UAS) program employs integrated C-UAS solution sets designed to protect high value or critical Naval assets from surveillance, or hostile threats posed from the inadvertent or unlawful misuse of unmanned aircraft systems (UAS). The C-UAS program provides an integrated Family of Systems (FoS) employing advanced target discrimination and defeat capabilities to meet fleet requirements. More details available at a higher classification level.

FY 2024 funding is requested to continue management and implementation of system assessment. Provide program management and systems engineering support for the technology development and acquisition strategy for fielding material solution. Funding provides for refinement of material solutions, threat assessments, identification and development of advanced target discrimination, defeat capabilities, and prototype development for integration into the C-UAS FoS.

Continues refinement of open architecture solution and interoperability standards for a C-UAS FoS. In partnership with the Joint C-UAS Office (JCO), will identify or develop additional detect and deter capabilities to integrate into the C-UAS FoS. As the JCO designated CORIAN Acquisition Lead, continued development, implementation and integration of additional sensor modalities to improve system detect/ID/track/defeat capabilities. Continues efforts to improve interoperability between ashore and afloat C-UAS systems.

B. Program Change Summary (\$ in Millions)	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024 Base</u>	<u>FY 2024 OCO</u>	<u>FY 2024 Total</u>
Previous President's Budget	5.529	7.438	8.430	-	8.430
Current President's Budget	5.462	7.438	11.567	-	11.567
Total Adjustments	-0.067	0.000	3.137	-	3.137
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.067	0.000			
• Program Adjustments	0.000	0.000	3.600	-	3.600
• Rate/Misc Adjustments	0.000	0.000	-0.463	-	-0.463

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Appropriation/Budget Activity
1319: *Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)*

R-1 Program Element (Number/Name)
PE 0604636N / *Counter Unmanned Aircraft System (C-UAS)*

Change Summary Explanation

FY 2022 funding request reduced by 67K
FY 2023 No changes
FY 2024 funding request increased by \$3,3137K for DRAKE 2.0 Development (\$3,600K) and miscellaneous reductions (-\$463K).
FY 2024 funding request reduced by \$0.492M due to material solutions and assessments. (Project 3241)

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy **Date:** March 2023

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604636N / <i>Counter Unmanned Aircraft System (C-UAS)</i>	Project (Number/Name) 2073 / <i>DRAKE 2.0 C-UAS Afloat</i>
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
2073: <i>DRAKE 2.0 C-UAS Afloat</i>	0.000	0.000	6.018	10.194	-	10.194	12.731	12.922	6.910	7.050	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The DRAKE Counter Unmanned Aircraft Systems (CUAS) is an Electronic Warfare (EW) Force Protection system designed to detect, identify, track, and defeat small Unmanned Aircraft Systems (sUAS) for afloat naval forces. To meet the non-kinetic requirements established in the OPNAV Top Level Requirement (TLR) for Afloat CUAS, the DRAKE system will be upgraded with improved radios, processors, and display units.

The program will utilize Commercial Off-The-Shelf (COTS) hardware, software, and advanced techniques to develop, test, and integrate into DRAKE. Increment 1 upgrades will focus on refreshing the core technology to replace legacy hardware with the latest COTS processors/controllers, which will significantly increase signal processing speed and bandwidth (NextGen SDR). These improvements will enable the system to counter more advanced commercial sUAS efficiently. A COTS tablet-like Graphical User Interface (GUI) called the Control Display Unit (CDU) 2.0 will replace the legacy CDU, providing enhanced visual tracking and identification data of UAS. This upgrade will ultimately improve situational awareness and signal analysis for the warfighter. In Increment 2, the DRAKE system will be integrated with ships' Command and Control with optimized antennas for C-sUAS mission to enhance ships' situational awareness and prosecution of UAS threats.

Prior to FY23, DRAKE C-UAS funding can be found in PE 0603654N/Project 3177.

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

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: DRAKE	0.000	6.018	10.194	0.000	10.194
Articles:	-	-	-	-	-
FY 2023 Plans:					
Complete integration of Increment 1 NextGen SDR hardware and software, and CDU 2.0. Develop and test advanced techniques to address evolving advanced threats. Begin testing and evaluation of NextGen SDR hardware and software, and CDU 2.0.					
FY 2024 Base Plans:					
Continue Test and Evaluation of NextGen SDR hardware and software. Develop, Test, and Integrate CUAS Software application required for CDU 2.0. Provide limited quantity of CDU 2.0 for for purpose of technology demonstration to the fleet DRAKE operators. Begin development of Increment 2 Optimized Antenna, Docking station, and Command and Control(C2) integration.					
FY 2024 OCO Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy	Date: March 2023
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Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604636N / <i>Counter Unmanned Aircraft System (C-UAS)</i>	Project (Number/Name) 2073 / <i>DRAKE 2.0 C-UAS Afloat</i>
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
N/A					
<i>FY 2023 to FY 2024 Increase/Decrease Statement:</i> Increase of \$4.176 from FY2023 to FY2024 to accelerate and complete development and delivery of DRAKE (CDU 2.0 & Docking station).					
Accomplishments/Planned Programs Subtotals	0.000	6.018	10.194	0.000	10.194

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

Remarks

D. Acquisition Strategy
Develop, integrate, test, and field hardware and software upgrades, and advanced techniques in DRAKE systems through the Technology Insertion and Technology Refresh process. Technology insertion candidates include the techniques, hardware and software performance improvements developed by United States Government (USG) laboratories, Federally Funded Research and Development Centers (FFRDCs), University Affiliated Research Centers (UARCs), and the JCREW prime contractor. Hardware and software updates will be integrated, tested, and implemented in DRAKE via Engineering Change Proposals (ECPs).

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy **Date:** March 2023

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604636N / <i>Counter Unmanned Aircraft System (C-UAS)</i>	Project (Number/Name) 2073 / <i>DRAKE 2.0 C-UAS Afloat</i>
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Product Development (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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			
System Development	C/FFP	Northrop Grumman : San Dieco, CA	0.000	0.000		0.662	Jan 2023	1.093	Jan 2024	-		1.093	Continuing	Continuing	Continuing
Systems Engineering	C/FFP	Northrop Grumman : San Dieco, CA	0.000	0.000		0.602	Jan 2023	1.035	Jan 2024	-		1.035	Continuing	Continuing	Continuing
Software Development	C/FFP	Northrop Grumman : San Dieco, CA	0.000	0.000		0.722	Jan 2023	2.985	Jan 2024	-		2.985	Continuing	Continuing	Continuing
System Integration	C/FFP	Northrop Grumman : San Dieco, CA	0.000	0.000		0.602	Jan 2023	1.398	Jan 2024	-		1.398	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		2.588		6.511		-		6.511	Continuing	Continuing	N/A

Remarks
FY23 to FY24 increased for CDU 2.0 development, testing, and fielding.

Support (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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			
Loadset Development	Various	NSWC : Various	0.000	0.000		0.751	Nov 2022	0.825	Nov 2023	-		0.825	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC : Various	0.000	0.000		1.354	Nov 2022	1.453	Nov 2023	-		1.453	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		2.105		2.278		-		2.278	Continuing	Continuing	N/A

Remarks
FY23 to FY24 increase associated with Loadset development, testing, integration of Next Generation Hardware & Software supporting Increment 1.

Test and Evaluation (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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			
Developmental Test & Evaluation (DT&E)	Various	Various : Various	0.000	0.000		1.325	Nov 2022	1.405	Nov 2023	-		1.405	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		1.325		1.405		-		1.405	Continuing	Continuing	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604636N / <i>Counter Unmanned Aircraft System (C-UAS)</i>	Project (Number/Name) 2073 / <i>DRAKE 2.0 C-UAS Afloat</i>

FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

Proj 2073	
Inc 1 Development and Integration	
Inc 1 Test and Evaluation	
Inc 2 Development and Integration	
Inc 2 Test and Evaluation	
Advanced Techniques Development	

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604636N / <i>Counter Unmanned Aircraft System (C-UAS)</i>	Project (Number/Name) 2073 / <i>DRAKE 2.0 C-UAS Afloat</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Proj 2073</i>				
Inc 1 Development and Integration	1	2023	2	2024
Inc 1 Test and Evaluation	2	2024	2	2025
Inc 2 Development and Integration	1	2025	3	2026
Inc 2 Test and Evaluation	2	2026	4	2027
Advanced Techniques Development	1	2023	4	2028

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy										Date: March 2023		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604636N / <i>Counter Unmanned Aircraft System (C-UAS)</i>				Project (Number/Name) 3241 / <i>Counter Unmanned Aircraft Systems (C-UAS)</i>			
COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
3241: <i>Counter Unmanned Aircraft Systems (C-UAS)</i>	5.548	5.462	1.420	1.373	-	1.373	1.665	1.572	1.351	1.377	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Counter Unmanned Aircraft System (C-UAS) program employs integrated C-UAS solution sets designed to protect high value or critical Naval assets from surveillance, espionage, or hostile threats posed from the inadvertent or unlawful misuse of unmanned aircraft systems (UAS). The C-UAS program provides an integrated Family of Systems (FoS) employing advanced target discrimination and defeat capabilities to meet fleet requirements. More details available at a higher classification level.

FY 2024 funding is requested to continue management and implementation of system assessment. Provide program management and systems engineering support for the technology development and acquisition strategy for fielding material solution. Funding provides for refinement of material solutions, threat assessments, identification and development of advanced target discrimination, defeat capabilities, and prototype development for integration into the C-UAS FoS.

Continues refinement of open architecture solution and interoperability standards for a C-UAS FoS. In partnership with the Joint C-UAS Office (JCO) will identify or develop additional detect and deter capabilities to integrate into the C-UAS FoS. As the JCO designated CORIAN Acquisition Lead, will continue development, implementation and integration of additional sensor modalities to improve system detect/ID/track/defeat capabilities. Will continue efforts to improve interoperability between ashore and afloat C-UAS systems.

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

	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: C-UAS System Development and Integration	5.462	1.420	1.373	0.000	1.373
Articles:	-	-	-	-	-
FY 2023 Plans:					
Continue management and implementation of system assessment. Provide program management, and systems engineering support for the technology development and acquisition strategy for fielding material solution. Funding provides for refinement of material solutions, threat assessments, identification and development of advanced target discrimination, defeat capabilities, development for integration into the C-UAS FoS. Continue management and technical support for C-UAS Systems Integration Lab (SIL). In partnership with the Joint C-UAS Office (JCO) will identify or develop additional detect and deter capabilities to integrate into the C-UAS FoS. As the JCO designated CORIAN Acquisition Lead, continue development, implementation and integration of additional sensor modalities to improve system detect/ID/track/defeat capabilities. Develop efforts to improve					

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Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604636N / <i>Counter Unmanned Aircraft System (C-UAS)</i>	Project (Number/Name) 3241 / <i>Counter Unmanned Aircraft Systems (C-UAS)</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
<p>interoperability between ashore and afloat C-UAS systems. Funding provides for continued development of data fusion architecture for external sensor integration into a C-UAS common Command and Control (C2).</p> <p><i>FY 2024 Base Plans:</i> Continue management and implementation of system assessment. Provide program management, and systems engineering support for the technology development and acquisition strategy for fielding material solution. Funding provides for refinement of material solutions, threat assessments, identification and development of advanced target discrimination, defeat capabilities, development for integration into the C-UAS FoS. Continue management and technical support for C-UAS Systems Integration Lab (SIL). In partnership with the Joint C-UAS Office (JCO) will identify or develop additional detect and deter capabilities to integrate into the C-UAS FoS. As the JCO designated CORIAN Acquisition Lead, will continue development, implementation and integration of additional sensor modalities to improve system detect/ID/track/defeat capabilities. Will continue efforts to improve interoperability between ashore and afloat C-UAS systems. Funding provides for continued development of data fusion architecture for external sensor integration into a C-UAS common Command and Control (C2).</p> <p><i>FY 2024 OCO Plans:</i> N/A</p> <p><i>FY 2023 to FY 2024 Increase/Decrease Statement:</i> Decrease of \$0.047 from FY2023 to FY2024 due to the reduction in material solutions and assessments.</p>					
Accomplishments/Planned Programs Subtotals	5.462	1.420	1.373	0.000	1.373

<p>C. Other Program Funding Summary (\$ in Millions) N/A</p> <p>Remarks</p> <p>D. Acquisition Strategy The Navy's acquisition strategy capitalizes on prior Rapid Development Capability efforts while leveraging JCO investments with the Program Office acting as Lead Systems Integrator. This acquisition strategy maintains commonality of current C-UAS solutions while continuing to evaluate, improve, and implement layered defense capabilities into the integrated FoS to defeat evolving threats. More details available at a higher classification level.</p>

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy												Date: March 2023		
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604636N / <i>Counter Unmanned Aircraft System (C-UAS)</i>				Project (Number/Name) 3241 / <i>Counter Unmanned Aircraft Systems (C-UAS)</i>						

Product Development (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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			
System Development	Various	Various : Not Specified	0.000	1.892	Jan 2022	0.000		0.129	Jan 2024	-		0.129	Continuing	Continuing	Continuing
Subtotal			0.000	1.892		0.000		0.129		-		0.129	Continuing	Continuing	N/A

Remarks
FY 2024 increased in System Development Cost supports external sensor integration with the C-UAS Family of Systems (FoS).

Support (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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			
Material solutions and assessments	Various	Various : Not Specified	2.959	1.749	Dec 2021	0.211	Jan 2023	0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			2.959	1.749		0.211		0.000		-		0.000	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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			
Program Management	Various	Various : Not Specified	1.117	0.781	Oct 2021	0.607	Oct 2022	0.621	Nov 2023	-		0.621	Continuing	Continuing	Continuing
Government Engineering Support	WR	NAWC, Patuxent River, MD : Not Specified	1.373	0.980	Oct 2021	0.541	Oct 2022	0.561	Nov 2023	-		0.561	Continuing	Continuing	Continuing
Travel	WR	Various : Not Specified	0.099	0.060	Oct 2021	0.061	Oct 2022	0.062	Nov 2023	-		0.062	Continuing	Continuing	Continuing
Subtotal			2.589	1.821		1.209		1.244		-		1.244	Continuing	Continuing	N/A

Remarks
FY 2024 Management Services increase reflects year to year inflation for Program Management, Government Engineering Support, and Travel.

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	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	5.548	5.462		1.420		1.373		-		1.373	Continuing	Continuing	N/A

Remarks

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604636N / <i>Counter Unmanned Aircraft System (C-UAS)</i>	Project (Number/Name) 3241 / <i>Counter Unmanned Aircraft Systems (C-UAS)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3241.L19				
System Development: C2 Architecture Capability	1	2022	4	2024
System Development: SIL Enhancement	1	2022	4	2022
Technology Maturation: Follow-on Threat Assessment 2	1	2022	4	2028