Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Office of the Secretary Of Defense	Date: May 2021
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604016D8Z / *Department of Defense Corrosion Program*

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	132.275	13.032	5.323	3.259	-	3.259	-	-	-	-	-	-
015: *Corrosion Protection Projects*	132.275	13.032	5.323	3.259	-	3.259	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The Department of Defense (DoD) initiated the Corrosion Program in 2003 in response to 10 U.S.C. 2228, which requires the Secretary of Defense to accomplish a number of actions including the implementation of a corrosion prevention/mitigation strategic plan for DoD equipment and infrastructure. The DoD Corrosion Prevention and Control Strategy was revised and signed in January 2021.

Corrosion is a significant contributor to maintenance costs for DoD equipment and facilities. The average annual cost of corrosion by Service and Major Weapon System Platform between 2004 and 2019 was greater than $16 billion, and between 16% and 25% of all maintenance costs are attributable to corrosion, depending on the type of system. Corrosion is also a direct contributor to reduced system availability.

The DoD Corrosion Program takes a comprehensive approach to reducing these impacts through the implementation of a long-term DoD Corrosion Prevention and Control Strategy. The overall strategic goal is to demonstrate the ability to improve military readiness through the implementation of targeted and effective material and nonmaterial solutions that reduce the corrosion impacts on availability and affordability of DoD weapon systems and infrastructure. The goal can be achieved through the implementation of changes or solutions in one or more of the following focus areas: accountability; technology development and transition; policy; updated specifications and standards; and workforce development and outreach.

To implement the DoD Corrosion Strategy, the DoD Corrosion Program focuses efforts into two categories: Activities and Technology Development and Implementation. Technology development and implementation includes demonstrating and validating mature technologies and advanced research on technologies aimed at reducing cost and increasing availability of DoD weapon systems and facilities.

Demonstration/validation projects are specific corrosion prevention/mitigation efforts funded by the CPO in the Office of the Secretary of Defense (OSD) with the objective of developing, testing, qualifying, and implementing new technologies. A number of low-risk, high-payoff technologies promise to vastly improve the service life and significantly reduce the maintenance costs and improve the availability and safety of weapon systems and facilities essential to maintain support for the warfighter. A total of 85 projects have been completed including a follow-on assessment of their return-on-investment estimates. The overall return on investment as estimated by the Military Departments is 17.2:1.

Advanced research includes Test and Evaluation projects, research studies, and research performed by academic institutions to include the Armed Forces' Academies. The primary objectives are: (1) generate products that contribute to the scientific understanding of material degradation and protection mechanisms, (2) explore the feasibility of technologies or processes for future demonstration/implementation projects, (3) generate knowledge products that contribute to ability to make data-driven decisions to prioritize corrosion prevention investments. Research areas include:

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Office of the Secretary Of Defense	Date: May 2021
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604016D8Z / *Department of Defense Corrosion Program*

- Improved and validated data analytics and predictive modeling
- Accelerated corrosion test method development
- Improved surface treatments and coatings
- New materials and materials processing techniques

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	13.165	3.325	3.373	-	3.373
Current President's Budget	13.032	5.323	3.259	-	3.259
Total Adjustments	-0.133	1.998	-0.114	-	-0.114
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-0.002			
• Congressional Rescissions	-	-			
• Congressional Adds	-	2.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.133	-			
• Program Adjustments	-	-	-0.114	-	-0.114

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2020	FY 2021
Project: 015: *Corrosion Protection Projects*		
Congressional Add: *Coating technology and requirements development for facilities and infrastructure*	5.000	-
Congressional Add: *DoD Workforce Painter Training*	2.800	2.000
Congressional Add: *General DoD Corrosion Program Increase*	2.000	-
Congressional Add Subtotals for Project: 015	9.800	2.000
Congressional Add Totals for all Projects	9.800	2.000

Change Summary Explanation

Realigned funds to meet National Defense Strategy priorities.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense											Date: May 2021	
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0604016D8Z / *Department of Defense Corrosion Program*				Project (Number/Name) 015 / *Corrosion Protection Projects*			
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**
015: *Corrosion Protection Projects*	132.275	13.032	5.323	3.259	-	3.259	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

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Corrosion is a significant contributor to maintenance costs for DoD equipment and facilities. The average annual cost of corrosion by Service and Major Weapon System Platform between 2004 and 2019 was greater than $16 billion, and between 16% and 25% of all maintenance costs are attributable to corrosion, depending on the type of system. Corrosion is also a direct contributor to reduced system availability.

The DoD Corrosion Program takes a comprehensive approach to reducing these impacts through the implementation of a long-term DoD Corrosion Prevention and Control Strategy. The overall strategic goal is to demonstrate the ability to improve military readiness through the implementation of targeted and effective material and nonmaterial solutions that reduce the corrosion impacts on availability and affordability of DoD weapon systems and infrastructure. The goal can be achieved through the implementation of changes or solutions in one or more of the following focus areas: accountability; technology development and transition; policy; updated specifications and standards; and workforce development and outreach.

To implement the DoD Corrosion Strategy, the DoD Corrosion Program focuses efforts into two categories: Activities and Technology Development and Implementation. Technology development and implementation includes demonstrating and validating mature technologies and advanced research on technologies aimed at reducing cost and increasing availability of DoD weapon systems and facilities.

Demonstration/validation projects are specific corrosion prevention/mitigation efforts funded by the CPO in the Office of the Secretary of Defense (OSD) with the objective of developing, testing, qualifying, and implementing new technologies. A number of low-risk, high-payoff technologies promise to vastly improve the service life and significantly reduce the maintenance costs and improve the availability and safety of weapon systems and facilities essential to maintain support for the warfighter. A total of 85 projects have been completed including a follow-on assessment of their return-on-investment estimates. The overall return on investment as estimated by the Military Departments is 17.2:1.

Advanced research includes Test and Evaluation projects, research studies, and research performed by academic institutions to include the Armed Forces' Academies. The primary objectives are: (1) generate products that contribute to the scientific understanding of material degradation and protection mechanisms, (2) explore the feasibility of technologies or processes for future demonstration/implementation projects, (3) generate knowledge products that contribute to ability to make data-driven decisions to prioritize corrosion prevention investments. Research areas include:

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604016D8Z / *Department of Defense Corrosion Program*	**Project (Number/Name)** 015 / *Corrosion Protection Projects*

• Improved and validated data analytics and predictive modeling
• Accelerated corrosion test method development
• Improved surface treatments and coatings
• New materials and materials processing techniques

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Corrosion Prevention and Control Projects and Activities	3.232	3.323	3.259

Description: Corrosion prevention and control projects and activities are conducted in support of the support of the strategic plan to reduce the impact of corrosion on the cost and availability of DoD equipment and facilities. Projects initiated in FY 2020 include:
•Zinc-rich Aerosol Products for Touch-up Painting of Steel Substrates – Increased efficiency of maintenance processes
•Improved Surface Preparation and Coatings for Corrosion Control of Aluminum Substrates – Extending intervals between coating applications
•Pressure Sensitive Adhesive Appliques for Quick Field Repair of Topcoat Damage – Improved field-level maintenance
•Weld-Through Coatings for Prevention of Crevice Corrosion in Skip-Welded Joints – Service life extension for ground vehicles
•COVID-19 Disinfectant Material Corrosion Compatibility testing – Understanding potential maintenance impacts resulting from disinfectant application

Support for advanced research in the areas of improving the accuracy of the algorithm for extracting corrosion information from maintenance data, aircraft structural repair using additive manufacturing, optimizing aircraft washdown intervals, corrosion sensor development, analytical corrosion prediction methods, mitigation of biologically induced corrosion, and prediction of environmentally assisted cracking was continued.

Activities executed included:
• Delivery of corrosion control and coatings training to field- and depot-level workforce
• Development of computer-based corrosion prevention design, management, and sustainment training for the acquisition workforce and facilities engineers
• Validation of Cost of Corrosion data for Navy Surface Ships
• Technical revisions to three corrosion-related military specifications

FY 2021 Plans:
• Selected and Funded FY 2021 long term Corrosion Demonstration/Validation Projects:
• GentooTM Coating Application to HH-60G Tail Landing Gear Yoke (Aerospace Systems)
Targeted Outcomes: Demonstrate a 240 hr total reduction in Non-Available Time and associated maintenance hours for a H-60 squadron.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604016D8Z / *Department of Defense Corrosion Program*	**Project (Number/Name)** 015 / *Corrosion Protection Projects*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
• Improved Landing Gear (LG) Durability for F/A-18E/F Super Hornet (Aerospace Systems) Targeted Outcomes: Reduction in LG corrosion maintenance, extending maintenance intervals from 84 days out 185 days - 365 days; and reduce unscheduled maintenance and repairs. • Ship Class Topside Corrosion Control Configuration (CT3C) Implementation (Ships) Targeted Outcomes: Reduce Maintenance Meantime of Organizational-level corrosion maintenance by 3,411 hrs per yer per LDP ship (44,343 hrs for the entire class of ship) • Environmentally Friendly Coating Assessment for Non-Immersed Marine Environments (Facilities) Targeted Outcomes: Validate a coating system with increased durability and corrosion performance reduces implementation costs by $6.85 per sq-ft. • Continue COVID-19 Disinfectant Material Corrosion Compatibility testing • Executing DoD Civilian Workforce CPC and Painter Application Project. • Corrosion Prevention Planning Risk Assessment Validation • Update Corrosion Maintenance algorithms to improve accuracy of aviation and ground vehicle data extraction from maintenance records • Continue support for advanced research projects ***FY 2022 Plans:*** • Yr 2 increment funding for FY 2021 long term Corrosion Demonstration/Validation Projects • Continue support for advanced research projects ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The FY 2022 Program Adjustment will result in a decrease in the investment in corrosion Demonstration/Validation Projects and Advanced Research projects.			
Accomplishments/Planned Programs Subtotals	3.232	3.323	3.259

	FY 2020	FY 2021
Congressional Add: Coating technology and requirements development for facilities and infrastructure ***FY 2020 Accomplishments:*** Funding sent to Army Corps of Engineers Construction Engineering Research Laboratory (CERL) for collaborative RDT&E effort with industry to expand and improve infrastructure R&D capabilities.	5.000	-
Congressional Add: DoD Workforce Painter Training	2.800	2.000

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604016D8Z / *Department of Defense Corrosion Program*	**Project (Number/Name)** 015 / *Corrosion Protection Projects*

	FY 2020	FY 2021
FY 2020 Accomplishments: Initiated Depot Survey on current workforce painter training requirements and content. Performing analysis of current DoD workforce painter training. ***FY 2021 Plans:*** Targeted Outcomes: (a) Identify current best practices, (b) Identify parameters for various painter training methodologies that are most effective within DoD Depot environment(s), (c) Advocate for the revision of the OPM Painter tradecraft position description (latest version is dated 1968), (d) Engage with USD(PR) to advocate for improved painter workforce training requirements within the OSD Strategic Human Capital Planning Process. Identifying painter training needs and gaps. Assessing multiple painter training methodologies and technologies.		
Congressional Add: General DoD Corrosion Program Increase ***FY 2020 Accomplishments:*** Performed Material Corrosion Compatibility testing to qualify the best COVID-19 Chemical Disinfectants for use on DoD weapon systems to minimize the detrimental sustainment impacts resulting from disinfectant chemicals while maximizing the health protection to maintainers and operators. Identified four products that achieve disinfection with minimal corrosion impacts. The Naval Air Systems Command issued a letter authorizing these products for use on Naval aviation systems. This information has been shared with the Air Force, Navy Research Lab and Army for consideration of similar authorizations.	2.000	-
Congressional Adds Subtotals	9.800	2.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Office of the Secretary Of Defense			Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604016D8Z / *Department of Defense Corrosion Program*	Project (Number/Name) 015 / *Corrosion Protection Projects*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Corrosion Policy and Oversight	MIPR	Various (Army, Navy, Air Force) : Various	111.057	6.285	Jan 2020	2.677	Oct 2021	0.000		-		0.000	-	-	-
		Subtotal	111.057	6.285		2.677		0.000		-		0.000	-	-	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Research Studies	C/FFP	Various : Various	-	2.402	Mar 2021	-		1.753	Mar 2022	-		1.753	-	-	-
Technical Support	MIPR	Various (Army, Navy, Air Force) : Various	-	-		0.408	Jun 2021	0.158	Jun 2022	-		0.158	-	-	-
Technical Support	Option/ FFP	Leidos, Inc. : Virginia	-	0.496	Mar 2021	-		-		-		-	-	-	-
Technical Support	C/FFP	Excet Inc. : Maryland	-	-		0.210	Jun 2021	0.221	Jun 2022	-		0.221	-	-	-
		Subtotal	-	2.898		0.618		2.132		-		2.132	-	-	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Critical Compatibility Testing - COVID19 (FY20 Congressional-Add)	MIPR	Various (Army, Navy, Air Force) : Various	-	0.850	Oct 2020	1.841	Jun 2021	-		-		-	-	-	-
		Subtotal	-	0.850		1.841		-		-		-	-	-	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Corrosion Policy and Oversight	C/FFP	Logistics Management	21.218	1.976	Feb 2020	0.000		0.943	Feb 2022	-		0.943	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Office of the Secretary Of Defense			Date: May 2021
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604016D8Z / *Department of Defense Corrosion Program*	Project (Number/Name) 015 / *Corrosion Protection Projects*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Institute : McLean, VA													
Corrosion Policy and Oversight	Option/ FFP	LMI : McLean, VA	-	1.023	Mar 2021	-		-		-		-	-	-	-
SBIR/STTR Funding	Allot	OSD : Virginia	-	-		0.123	Jun 2021	0.120	Jun 2022	-		0.120	-	-	-
USD(A&S) Management Reserve	Allot	USD(A&S) : Virginia	-	-		0.064	Jun 2021	0.064	Jun 2022	-		0.064	-	-	-
		Subtotal	21.218	2.999		0.187		1.127		-		1.127	-	-	N/A

	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	132.275	13.032		5.323		3.259		-		3.259	-	-	N/A

Remarks

N/A

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604016D8Z / *Department of Defense Corrosion Program*	**Project (Number/Name)** 015 / *Corrosion Protection Projects*

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604016D8Z / *Department of Defense Corrosion Program*	**Project (Number/Name)** 015 / *Corrosion Protection Projects*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Corrosion Policy and Oversight				
Zinc-rich aerosol products for touch-up painting of steel substrates	3	2020	4	2021
Improved surface preparation and coatings for corrosion control of aluminum substrates	3	2020	4	2021
Pressure sensitive adhesive appliques for quick field repair of topcoat damage	3	2020	4	2021
Weld-through coatings for prevention of crevice corrosion in skip-welded joints	3	2020	4	2021
COVID-19 disinfectant material corrosion compatibility testing	2	2020	4	2021
Implementation of Zinc-Nickel (1Z-C17 +Zn-Ni) Electroplating as an Alternative to Cadmium	3	2016	4	2021
GentooTM Coating Application to HH-60G Tail Landing Gear Yoke	2	2021	1	2023
Improved Landing Gear Durability for F/A-18E/F Super Hornet	2	2021	4	2024
Ship Class Topside Corrosion Control Configuration (CT3C) Implemetation	2	2021	4	2024
Environmentally Friendly Coating Assessment for Non-Immersed Marine Environment	2	2021	4	2022
Improving the accuracy of the algorithm for extracting corrosion information from maintenance data	1	2020	4	2020
Aircraft structural repair using additive manufacturing	4	2018	1	2023
Optimizing aircraft washdown intervals	4	2018	1	2021
Corrosion sensor development	4	2018	4	2020
Analytical corrosion prediction methods	4	2018	1	2023
Mitigation of biologically induced corrosion	4	2018	1	2023
Prediction of environmentally assisted cracking	4	2018	1	2022
DoD Workforce Painter Training	2	2020	4	2021