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Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Defense Threat Reduction Agency **Date:** April 2022

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604551BR / <i>Catapult</i>
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COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
Total Program Element	8.110	0.000	7.166	7.130	0.000	7.130	7.328	7.475	7.625	7.777	Continuing	Continuing
RA: <i>CWMD Cross-Cutting Technical and Information Sciences</i>	8.110	0.000	7.166	7.130	0.000	7.130	7.328	7.475	7.625	7.777	Continuing	Continuing

Note

Catapult activities, previously justified under program element 0604134BR, were realigned to this program element to better reflect the nature of these ongoing activities. In FY 2020, \$8.110 million was appropriately executed in PE 0604134BR for the Catapult Program of Record. Within the exhibit, execution is reflected in PE 0604551BR which was newly established for Catapult beginning in FY 2022.

A. Mission Description and Budget Item Justification

This program designs, develops, tests, and delivers mission capabilities that support the ability to aggregate, and analyze data on global emerging threats and expedites DTRA's technology transition from the laboratory to operational use to reduce risk within the acquisition process. This is done by developing and deploying emerging technologies into our fully operational system through our Development, Security, and Operations (DevSecOps) pipeline.

B. Program Change Summary (\$ in Millions)

	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023 Base</u>	<u>FY 2023 OCO</u>	<u>FY 2023 Total</u>
Previous President's Budget	0.000	7.166	0.000	0.000	0.000
Current President's Budget	0.000	7.166	7.130	0.000	7.130
Total Adjustments	0.000	0.000	7.130	0.000	7.130
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Year	-	-	7.130	0.000	7.130

Change Summary Explanation

FY 2023 funds increase because the FY 2022 President's Budget request did not include out-year funding.

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Defense Threat Reduction Agency										Date: April 2022		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0604551BR / <i>Catapult</i>				Project (Number/Name) RA / <i>CWMD Cross-Cutting Technical and Information Sciences</i>			
COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
RA: <i>CWMD Cross-Cutting Technical and Information Sciences</i>	8.110	0.000	7.166	7.130	0.000	7.130	7.328	7.475	7.625	7.777	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project enables DTRA's Catapult Information System Program to design, develop, test and deliver mission capabilities that support the ability to aggregate and analyze data on global emerging threats, threat actors and threat networks. Catapult allows DTRA to rapidly develop, engineer, test and deploy analytical tools, data science methodologies and software applications in support of the warfighter. Catapult and its associated Attack the Network Tool Suite (ANTS) integrates data sources that support the detection and identification of emerging threats, threat networks and actors, command and control, operations, intelligence, and engagement for neutralizing, attacking and defeating both current and emerging threats and threat networks.

Catapult uses its RDT&E funding to meet user needs using tools and services that reside in Catapult, a cloud technology-based data analytics platform developed and delivered by DTRA that provides an extensible, continuously augmented, real-time repository of data on emerging threats and worldwide threat actors. Catapult is fully operational and accredited on the Secret Internet Protocol Router Network (SIPRNet) and Joint Worldwide Intelligence Communications System (JWICS). The Catapult architecture pulls from more than 850 data sources on SIPRNet and more than 170 data sources on JWICS. Catapult uses ANTS tools and services to provide national-level capabilities for data and information capture, discovery, access, aggregation, correlation, visualization, analysis, sharing, and distribution for users from the strategic level to the tactical edge.

This project achieves transformational mission capabilities and postures the Agency to meet emerging mission requirements through innovative technology solutions and service upgrades.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: RA: <i>CWMD Cross-Cutting Technical and Information Sciences</i>	0.000	7.166	7.130	0.000	7.130
Description: This project enables DTRA's Catapult Information System Program to design, develop, test, and deliver mission capabilities that support the ability to aggregate and analyze data on global emerging threats. Catapult allows DTRA to rapidly develop, engineer, test and deploy analytical tools, data science methodologies and software applications in support of the warfighter.					
The project achieves transformational mission capabilities and postures the Agency to meet emerging mission requirements through innovative technology solutions and service upgrades.					

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<p><i>FY 2022 Plans:</i></p> <ul style="list-style-type: none"> - Develop predictive Data Science models through supervised and unsupervised Machine Learning against current and emerging threats; including fusion of multi-INT data across unclassified and classified data sets to identify networks and locations of interest to DTRA and its mission partners. - Create a new development environment to enable “technology at the edge” to support real-time development of new Data Science models/algorithms at mission partner sites to enhance existing or future Catapult Machine Learning models. - Implement role-based access control and dynamic query analytics across Catapult data through Elastic Search to enable users to quickly retrieve known affiliates, family members, contacts, aliases, email addresses and other information about entities and enemy threat networks without running additional queries. - Create “Functions as a Service” by commoditizing common used functions and analytics across the ANTS to enable scalability and elasticity across the tool suite allowing ANTS capabilities to execute analytics against larger and more diverse data sets. - Extend Catapult architecture to allow for shared services across Whole of Government to enable analytics to be re-used in other platforms and tools across various IC and DoD organizations. - Develop Active Learning interface and pipeline to enable crowdsourced input for training and tagging data to feed new Data Science machine learning models. - Modularize Catapult’s Data Processing Framework to enable targeted data transformation based on data source, artifact mime type, artifact size or any number of other source specific properties. Add better processing support for structured data, imagery, financial, SIGINT, Measurement and Signature Intelligence (MASINT), Internet of Things (IoT) and cyber data to broaden the scope of the Catapult Analytics stack. - Determine the capabilities that go beyond simple content identification and labeling, and move toward understanding the story and context of the video or image. - Determine unsupervised and supervised techniques to cluster relevant information, and enable accurate insight for analysts to improve the understanding of (1) themes, (2) intent of extracted text, (3) topics, (4) authenticity, etc. within the given data set(s) (Natural Language Processing – Understanding and Context). - Improve processing with alternative hardware (neuromorphic processors, Field Programmable Gate Arrays, etc.) by determining the best next generation hardware designed to maximize the runtime efficiency, accuracy and limited space/power consumption of select Artificial Intelligence/Machine Learning (AI/ML) solutions. <p><i>FY 2023 Base Plans:</i></p>					

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<ul style="list-style-type: none"> - Develop predictive Data Science models through supervised and unsupervised Machine Learning (ML) against current and emerging threats; including fusion of multi-INT data across unclassified and classified data sets to identify networks and locations of interest to DTRA and its mission partners. - Integrate ML-driven application features into ANTS capabilities, such as ML JavaScript libraries, to enhance human-centered design of applications and tailor individual access to applications to improve user experience. - Develop an Active Learning-enabled extension to the data annotation platform to accelerate preparation of training sets for both new and retrained machine learning models. - Develop a Named Entity Recognition (NER) enhancement using machine learning techniques to expand the scope of captured entities, including events, location features, person attributes and affiliations. - Integrate a query expansion capability to automatically recommend keywords in the corpus of documents as users are typing queries; accelerate document discovery and enhance information retrieval features in ANTS applications. - Automate the process of labeling data for supervised machine learning by integrating labeling functions or custom recipes. - Modernize the Catapult data model using JADC2-recognized formats, such as National Information Exchange Model (NIEM), or other open and recognized data model standards to improve the cross-compatibility of the Catapult corpus with other data repositories in the DoD. - Standardize open API services to adhere to JADC2 recommendations to improve data accessibility by using familiar lexicon, formats and techniques for retrieving data by data-as-a-service subscribers and citizen data scientists. - Develop the Next Generation of the Catapult Information System to align to the Joint All Domain Command and Control and Joint Warfighting Concept. <p>FY 2023 OCO Plans: N/A</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: The decrease from FY 2022 to FY 2023 is due to the realignment of information technology engineering and implementation funding to RA: CWMD Cross-Cutting Technical and Information Sciences in program element 0602718BR.</p>					
Accomplishments/Planned Programs Subtotals	0.000	7.166	7.130	0.000	7.130

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

Line Item	FY 2021	FY 2022	FY 2023	FY 2023	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	Cost To	Total Cost
			Base	OCO	Total					Complete	
• 12/0602134BR: <i>Improvised Threat Reduction Applied Research</i>	2.449	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.449
• 23/0602718BR: <i>CWMD Applied Research</i>	36.288	48.112	32.670	0.000	32.670	39.918	40.914	32.639	33.543	0.000	0.000
• 32/0603160BR: <i>CWMD Advanced Technology Development</i>	50.959	84.660	78.991	0.000	78.991	84.775	86.706	84.214	84.684	0.000	0.000
• 95/0604134BR: <i>Counter Improvised- Threat Technology Demonstration, Prototype Development and Testing</i>	6.833	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.833
• 159/0605502BR: <i>Small Business Innovation Research</i>	14.241	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	14.241

Remarks

N/A

D. Acquisition Strategy

Assessment and selection of best performers to provide contractual services to develop and operationalize requirements through the new contract vehicle (IMAX) at the least risk, optimal cost and proven technically. Performer base selection includes research developers across DoD and other Government agency laboratories, academia, and industry.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Defense Threat Reduction Agency **Date:** April 2022

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Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
Catapult Information System	C/CPAF	Booz Allen Hamilton : Reston, VA	5.218	0.000		5.969	Jul 2022	6.140	Jul 2023	0.000		6.140	Continuing	Continuing	-
Subtotal			5.218	0.000		5.969		6.140		0.000		6.140	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
Catapult Information System	C/CPAF	Booz Allen Hamilton : Reston, VA	0.917	0.000		0.000		0.000		0.000		0.000	0.000	0.917	0.917
Subtotal			0.917	0.000		0.000		0.000		0.000		0.000	0.000	0.917	N/A

Test and Evaluation (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
Catapult Information System	C/CPAF	Booz Allen Hamilton : Reston, VA	0.500	0.000		0.963	Jul 2022	0.990	Jul 2023	0.000		0.990	Continuing	Continuing	-
SETA - Capability Research Architecture Cell (CRAC)	C/CPAF	TBD : Ft. Belvoir, VA	1.475	0.000		0.000		0.000		0.000		0.000	0.000	1.475	-
TACEON	C/CPAF	TBD : TBD	0.000	0.000		0.234		0.000		0.000		0.000	0.000	0.234	-
Subtotal			1.975	0.000		1.197		0.990		0.000		0.990	Continuing	Continuing	N/A

	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		8.110	0.000	7.166	7.130	0.000	7.130	Continuing	Continuing	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2023 Defense Threat Reduction Agency		Date: April 2022
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FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
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

Catapult and Technology Analysis	
Catapult / Attack the Network Tool Suite (ANTS) Support	

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Defense Threat Reduction Agency		Date: April 2022
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Catapult and Technology Analysis</i>				
Catapult / Attack the Network Tool Suite (ANTS) Support	4	2022	4	2027