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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Defense Threat Reduction Agency **Date:** February 2020

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 0604134BR / Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing
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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	135.144	169.638	113.590	0.000	19.931	19.931	39.432	30.015	29.690	29.746	Continuing	Continuing
JC: Enable Rapid Capability Delivery	117.640	158.660	103.793	0.000	9.841	9.841	29.146	19.430	18.803	18.641	Continuing	Continuing
JS: Assist Situational Understanding	17.504	10.978	9.797	0.000	10.090	10.090	10.286	10.585	10.887	11.105	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element supports the development, demonstration, and testing of technologies to advance the analytical infrastructure, methods, and tools to enhance asymmetric countermeasure solutions. Advancements in analytics include the production of tools that leverage machine learning and artificial intelligence, increasing our ability to expedite the understanding of threat facilitation network connections and activities. This investment also enables development and delivery of capabilities to understand, anticipate, illuminate, isolate, and/or mitigate asymmetric threats and their effects.

DTRA expedites technology transition from the laboratory to operational use to reduce risk within the acquisition process. This is done by evaluating integrated technologies or prototype systems in a high quality and realistic operating environment.

B. Program Change Summary (\$ in Millions)	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>
Previous President's Budget	148.772	113.590	0.000	69.950	69.950
Current President's Budget	169.638	113.590	0.000	19.931	19.931
Total Adjustments	20.866	0.000	0.000	-50.019	-50.019
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Realignments	20.866	-	0.000	-19.709	-19.709
• Defense Wide Review Adjustments	-	-	0.000	-30.310	-30.310

Change Summary Explanation

The decrease from FY 2020 to FY 2021 reflects:

(1) a realignment of funds to PE 0603160BR (Counter Weapons of Mass Destruction Advanced Technology Development) to fund higher priority investments including WMD counterterrorism technologies, and

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Appropriation/Budget Activity	R-1 Program Element (Number/Name)
0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	PE 0604134BR / <i>Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing</i>

(2) Defense-Wide Review (DWR) adjustment of -\$30.310 million resulting from reductions to DTRA's lowest priority RDT&E programs and the transfer of C-IED programs to the Army to better align RDT&E efforts with the C-IED mission holder. The Army assumes executive agent responsibilities for C-IED effective 1 October 2020.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Defense Threat Reduction Agency **Date:** February 2020

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604134BR / <i>Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing</i>	Project (Number/Name) JC / <i>Enable Rapid Capability Delivery</i>
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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
JC: <i>Enable Rapid Capability Delivery</i>	117.640	158.660	103.793	0.000	9.841	9.841	29.146	19.430	18.803	18.641	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

DTRA delivers counter asymmetric threats materiel solutions in support of joint and combined forces, effectively addressing changes to threat tactics, techniques, and procedures (TTPs). DTRA responds to asymmetric threats identified by the forward deployed warfighter as well as academia and industry.

This project builds prototypes and tests and evaluates existing industry systems to meet Combatant Command capability gaps and emerging asymmetric threats. DTRA also provides solutions to prevent or mitigate battlefield operational surprise.

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: JC: Enable Rapid Capability Delivery	158.660	103.793	0.000	9.841	9.841
Description: This project delivers materiel solutions to counter asymmetric threats in support of joint and combined forces supporting contingency operations, effectively addressing changes to threat tactics, techniques, and procedures (TTPs).					
FY 2020 Plans:					
- Improve size, weight, power and integration of sensors to small unmanned systems.					
- Improve on-board vs. off-board data processing to provide real time data in unmanned systems to support real time improvised threat detection.					
- Improve/develop detection and defeat of Unmanned Systems capabilities using future technology, including acoustic detection at range, machine learning of constantly changing threat signatures (acoustic, RF signal, radar cross-section, optics, Unattended Radiated Emissions (URE), etc.).					
FY 2021 Base Plans:					
N/A					
FY 2021 OCO Plans:					
- Develop two user-friendly technologies to inform and evaluate the autonomous systems and energetics focus areas.					

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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604134BR / <i>Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing</i>	Project (Number/Name) JC / <i>Enable Rapid Capability Delivery</i>

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Develop an aviation sensor fabrication prototype to address detection and identification capability gaps (Split Aces and Hyper Spectral Imaging).					
- Provide two to three models and simulations in support of Counter Asymmetric Systems activities.					
- Conduct one theater support/ capabilities test in support of asymmetric threats.					
- Conduct one vendor demonstration and validate system performance capabilities for asymmetric threats.					
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> The decrease from FY 2020 to FY 2021 reflects: (1) a realignment of funds to PE 0603160BR (Counter Weapons of Mass Destruction Advanced Technology Development) to fund higher priority investments including WMD counterterrorism technologies, and (2) Defense-Wide Review (DWR) adjustment of -\$30.310 million resulting from reductions to DTRA's lowest priority RDT&E programs and the transfer of C-IED programs to the Army to better align RDT&E efforts with the C-IED mission holder. The Army assumes executive agent responsibilities for C-IED effective 1 October 2020.					
Accomplishments/Planned Programs Subtotals	158.660	103.793	0.000	9.841	9.841

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

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• 10/0602134BR/JC: <i>Counter Improvised-Threat Advanced Studies</i>	0.000	0.502	0.000	2.500	2.500	6.117	6.564	6.657	6.830	Continuing	Continuing
• 28/0603134BR/JC: <i>Counter Improvised-Threat Simulation</i>	13.648	49.528	0.000	3.861	3.861	59.179	60.803	61.661	63.394	Continuing	Continuing

Remarks

D. Acquisition Strategy

Assess and select best performer for developmental requirements to meet specific military capability needs. Performer base 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 2021 Defense Threat Reduction Agency **Date:** February 2020

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604134BR / Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing	Project (Number/Name) JC / Enable Rapid Capability Delivery
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Anti-Armor IED (AAIED)	C/FFP	Battelle : Idaho Falls, ID	-	9.556	Apr 2019	7.052	Nov 2019	-		-		-	0.000	16.608	16.608
Booby Trapped Structures (BTS)	C/FFP	Shield AI : San Diego, CA	3.420	7.066	May 2019	4.251	May 2020	-		-		-	0.000	14.737	14.737
Buried IED	C/CPFF	Naval Research Lab : Washington, DC	-	7.553	Feb 2019	2.299	Nov 2019	-		-		-	0.000	9.852	9.852
Home-Made Explosives (HME)	C/CPFF	Manufacturing Techniques, Inc. (MTEQ) HQ : Lorton, VA	17.956	8.825	Mar 2019	5.002	Mar 2020	-		-		-	0.000	31.783	31.783
Network	C/FFP	John Hopkins : Baltimore, MD	16.121	15.963	Apr 2019	12.875	Apr 2020	-		-		-	0.000	44.959	44.959
Person-Born IED (PBIED)	C/FFP	MIT Lincoln Laboratory (MIT-LL) : Lexington, MA	4.000	9.704	May 2019	5.752	May 2020	-		-		-	0.000	19.456	19.456
Radio Controlled IED (RCIED)	C/CPFF	Rampart Technologies, Colorado Springs, CO : Sericore, Hanover, MD	-	3.015	May 2019	0.500	Nov 2019	-		-		-	0.000	3.515	3.515
RDT&E Technology Enablers	C/CPFF	Various : Various	18.663	23.451	Jan 2019	12.662	Jan 2020	-		-		-	0.000	54.776	54.776
Sensitive Integration Office (SIO) Programs	C/CPFF	Various : Various	15.551	18.220	May 2019	10.000	Nov 2019	-		-		-	0.000	43.771	43.771
Tunnel	C/FFP	ERDC: Vicksburg, MS : MIT Lincoln Labs: Boston, MA	5.250	4.958	Mar 2019	0.000		-		-		-	0.000	10.208	10.208
Unmanned Aerial Systems (UAS)	C/FFP	Technology Service Corporation (TSC) Fairfax, VA : BAE Systems, Fridley, MN	10.223	6.419	May 2019	17.005	May 2020	-		-		-	0.000	33.647	33.647

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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Vehicle-Attached IED (VAIED)	C/CPFF	Various : TBD	-	2.770	Apr 2019	0.000		-		-		-	0.000	2.770	2.770
Vehicle-Borne IED (VBIED)	C/CPFF	Naval Surface Warfare Center (NSWC) Dahlgren : King George County, VA	7.500	11.815	May 2019	5.249	May 2020	-		-		-	0.000	24.564	24.564
Water-Borne IED (WBIED)	C/FFP	Various : Various	0.954	4.073	Aug 2019	0.000		-		-		-	0.000	5.027	5.027
Integrated Signatures Program (ISP)	MIPR	Indian Head Explosive Ordnance Technology Division : Indian Head, MD	-	-		-		0.000		4.000	Jan 2021	4.000	Continuing	Continuing	-
Split Aces 4.0	MIPR	Naval Air Systems Command PM263 : Patuxent River, MD	-	-		-		0.000		2.841	Feb 2021	2.841	Continuing	Continuing	-
Subtotal			99.638	133.388		82.647		0.000		6.841		6.841	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Test and Evaluation (T&E) 6.4	MIPR	Naval Air Weapons Station : China Lake, CA	11.485	11.397	Dec 2018	13.637	Jan 2019	-		-		-	0.000	36.519	36.519
T&E Threat Support 6.4	MIPR	Intelligence and Information Warfare Directorate (I2WD), Communications-Electronics Research, Development and Engineering Center (CERDEC) :	5.275	9.155	Dec 2018	7.509	Jan 2019	-		-		-	0.000	21.939	21.939

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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	FY 2012				FY 2013				FY 2014				FY 2015				FY 2016				FY 2017				FY 2018			
	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
Anti-Armor IED (AAIED)																												
Explosive Form Projectile (EFP) Detect - High Resolution Electro-Optical Infrared Camera (HREIOR)																												
Explosive Form Projectile (EFP) Detect - Stalker																												
Explosive Form Projectile (EFP) Detect Spiral																												
Non-Linear Junction Tech																												
EFP Detection & Defeat																												
Booby Trapped Structures (BTS)																												
Iron Horse																												
Buried IED																												
Microwave Frequency Oscillator (MFO) - Mineroller																												
Spectral Polarmetric Instrument Data Analysis (SPIDA)																												
SPIDA Spiral (Automated Change Detection)																												
Home-Made Explosives (HME)																												
Mini Hyper Spectral Imaging Group 3																												
Standoff Portable Isotopic Neutron Spectroscopy (SPINS)																												
Improvised Threat Device Replication																												
T&E Threat Support																												
Network																												
Cobalt Doom																												

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Defense Threat Reduction Agency **Date:** February 2020

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604134BR / <i>Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing</i>	Project (Number/Name) JC / <i>Enable Rapid Capability Delivery</i>
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	FY 2012				FY 2013				FY 2014				FY 2015				FY 2016				FY 2017				FY 2018			
	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
Explosives attribution and exploitation (EA2)																												
Improved National Technical Means (NTM) Integration																												
North Wind																												
Gold Bloom																												
Iris Sanctum																												
Iris Trace																												
Science and Technology Counter Network																												
Sensitive Integration Office Programs																												
Tough Luck																												
Velvet Paper																												
ISP																												
Person-Born IED (PBIED)																												
Atomic Magnetometer																												
PBIED Sensor Integration (Tiger Paw)																												
Radio Controlled IED (RCIED)																												
Songbird (Whistler Spiral)																												
RDT&E Technology Enablers																												
Technical Outreach BA 4																												
Counter-small Unmanned Aerial Systems (C-sUAS)																												
C-sUAS Test and Evaluation																												
GroundTaker																												
Microwave Frequency Oscillator (MFO) C-sUAS																												

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Defense Threat Reduction Agency **Date:** February 2020

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604134BR / <i>Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing</i>	Project (Number/Name) JC / <i>Enable Rapid Capability Delivery</i>
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	FY 2012				FY 2013				FY 2014				FY 2015				FY 2016				FY 2017				FY 2018			
	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

Mobile C-sUAS Airborne Platform Suite (MCAPS) Spiral																												
Multi vs. Multi Airborne Dispersed																												
Multi vs. Multi Dismounted Deployed																												
Pike on Reaper																												
Tech Exploitation Tech Red Device Coordination																												
Split Aces 4.0																												
Test & Eval																												
Test & Evaluation Support																												
Vehicle-Borne IED (VBIED)																												
Supernova Spiral																												
C-IED																												
Travel																												
Rapid Experimentation and Analysis for Development Support (READS)																												
UK Joint Tech Development																												
VBIED Detection Sensor Integration																												

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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

Anti-Armor IED (AAIED)																												
Explosive Form Projectile (EFP) Detect - High Resolution Electro-Optical Infrared Camera (HREIOR)																												

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Defense Threat Reduction Agency **Date:** February 2020

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604134BR / <i>Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing</i>	Project (Number/Name) JC / <i>Enable Rapid Capability Delivery</i>
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	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
Tech Exploitation Tech Red Device Coordination	[REDACTED]																											
Split Aces 4.0	[REDACTED]																											
Test & Eval																												
Test & Evaluation Support	[REDACTED]																											
Vehicle-Borne IED (VBIED)																												
Supernova Spiral	[REDACTED]																											
C-IED																												
Travel	[REDACTED]																											
Rapid Experimentation and Analysis for Development Support (READS)	[REDACTED]																											
UK Joint Tech Development	[REDACTED]																											
VBIED Detection Sensor Integration	[REDACTED]																											

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Defense Threat Reduction Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604134BR / <i>Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing</i>	Project (Number/Name) JC / <i>Enable Rapid Capability Delivery</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Anti-Armor IED (AAIED)				
Explosive Form Projectile (EFP) Detect - High Resolution Electro-Optical Infrared Camera (HREIOR)	1	2020	4	2020
Explosive Form Projectile (EFP) Detect - Stalker	1	2020	4	2020
Explosive Form Projectile (EFP) Detect Spiral	1	2020	4	2020
Non-Linear Junction Tech	1	2019	4	2020
EFP Detection & Defeat	1	2020	1	2020
Booby Trapped Structures (BTS)				
Iron Horse	3	2019	1	2020
Buried IED				
Microwave Frequency Oscillator (MFO) - Mineroller	1	2019	2	2020
Spectral Polarimetric Instrument Data Analysis (SPIDA)	1	2019	4	2020
SPIDA Spiral (Automated Change Detection)	3	2020	4	2020
Home-Made Explosives (HME)				
Mini Hyper Spectral Imaging Group 3	4	2018	4	2020
Standoff Portable Isotopic Neutron Spectroscopy (SPINS)	3	2019	2	2020
Improvised Threat Device Replication				
T&E Threat Support	1	2020	4	2020
Network				
Cobalt Doom	1	2018	4	2020
Explosives attribution and exploitation (EA2)	1	2019	4	2020
Improved National Technical Means (NTM) Integration	4	2019	4	2020

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Defense Threat Reduction Agency **Date:** February 2020

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604134BR / <i>Counter Improvised-Threat Technology Demonstration, Prototype Development, and Testing</i>	Project (Number/Name) JC / <i>Enable Rapid Capability Delivery</i>
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
North Wind	4	2015	4	2020
Gold Bloom	2	2013	4	2020
Iris Sanctum	4	2012	4	2020
Iris Trace	4	2012	4	2020
Science and Technology Counter Network	1	2012	4	2020
Sensitive Integration Office Programs	1	2015	4	2020
Tough Luck	2	2014	4	2020
Velvet Paper	1	2012	4	2020
ISP	1	2021	4	2024
Person-Born IED (PBIED)				
Atomic Magnetometer	2	2019	3	2020
PBIED Sensor Integration (Tiger Paw)	1	2018	2	2020
Radio Controlled IED (RCIED)				
Songbird (Whistler Spiral)	1	2020	4	2020
RDT&E Technology Enablers				
Technical Outreach BA 4	1	2016	4	2020
Counter-small Unmanned Aerial Systems (C-sUAS)				
C-sUAS Test and Evaluation	1	2019	4	2024
GroundTaker	3	2018	4	2020
Microwave Frequency Oscillator (MFO) C-sUAS	4	2016	4	2020
Mobile C-sUAS Airborne Platform Suite (MCAPS) Spiral	2	2019	4	2020
Multi vs. Multi Airborne Dispersed	1	2020	4	2022
Multi vs. Multi Dismounted Deployed	1	2020	4	2020
Pike on Reaper	4	2019	4	2020
Tech Exploitation Tech Red Device Coordination	1	2019	4	2020

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Defense Threat Reduction Agency **Date:** February 2020

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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Split Aces 4.0	1	2020	4	2021
<i>Test & Eval</i>				
Test & Evaluation Support	1	2020	4	2020
<i>Vehicle-Borne IED (VBIED)</i>				
Supernova Spiral	4	2019	4	2020
<i>C-IED</i>				
Travel	1	2018	4	2020
Rapid Experimentation and Analysis for Development Support (READS)	3	2012	4	2020
UK Joint Tech Development	1	2019	4	2020
VBIED Detection Sensor Integration	3	2019	4	2020

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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
JS: <i>Assist Situational Understanding</i>	17.504	10.978	9.797	0.000	10.090	10.090	10.286	10.585	10.887	11.105	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

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 collect, aggregate, and analyze intelligence data on global improvised threats and threat networks. Catapult and DTRA’s Mission Information Technology (MIT) capability allows DTRA to rapidly develop, engineer, test and deploy analytical tools, threat models and simulations, data science methodologies, and software applications in support of the Warfighter. Catapult and its associated Attack the Network Tool Suite (ANTS) integrates intelligence data sources that support the detection and identification of improvised threats, threat networks and actors, command and control, operations, intelligence, and engagement for neutralizing, attacking, and defeating both current and emerging improvised threats and threat networks.

DTRA’s MIT capability, with its embedded Combatant Command (CCMD) capability, data integrators, and reachback staff work continuously to create capabilities requested by users from the DoD, the Intelligence Community (IC), interagency partners, and the Whole of Government to ingest, fuse, analyze, and present mission relevant data and information. These capabilities reside in Catapult, a cloud technology-based data analytics platform developed and being delivered by DTRA that provides an extensible, continuously augmented, real-time repository of intelligence on improvised threats, including IEDs, and worldwide threat actors and networks. 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 a set of more than 100 tools (ANTS) 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.

In addition to Catapult, the DTRA MIT created and deployed a significant capability called Voltron. Voltron provides analysts access to signals intelligence (SIGINT) data within a secure and IC-accredited software developer environment. Voltron provides users a single interface to query more than 25 data sources and combines results into dynamic visualizations and exports. Voltron captures analytics techniques and provides a constantly growing toolbox providing analysts with continuously new models in support of analysis and operations. Voltron provides analysts access to methodologies involving multi-INT fusion in an easy to use interface. These methods are based on years of experience supporting the tactical targeting environment and built in collaboration with other teams across the IC. There are currently more than 75 models in Voltron available to the user community.

DTRA’s authorities and mission have enabled a unique, Secure Development Operations (DevSecOps) “Path-to-Production” to rapidly develop and deploy mission-driven IT solutions. This unique development environment includes an integrated Cyber Security Assessment and Authorization process, an in-house collateral

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Authorizing Official for SIPRNet and DIA-approved Authorization to Operate on JWICS, creating a strong partnership between technologists and intelligence analysts working real-world problems, and a collaborative and innovative culture that launches practical software solutions rapidly.

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>Title: JS: Assist Situational Understanding</p> <p>Description: This project enables DTRA to design, develop, test, and deliver mission capabilities that support the ability to collect, aggregate, and analyze intelligence data on global improvised threats and threat networks. The project allows DTRA to rapidly develop, engineer, test, and deploy analytical tools, threat models and simulations, data science methodologies, and software applications in support of the Warfighter. Catapult and its associated Attack the Network Tool Suite (ANTS) integrates intelligence data sources that support the detection and identification of improvised threats, threat networks and actors, command and control, operations, intelligence, and engagement for neutralizing, attacking, and defeating both current and emerging improvised threats and threat networks.</p> <p>Provides testing and engineering support for COTS and GOTS intelligence analysis application and software and systems that operate on the mission enclave. Supports cybersecurity testing and security engineering of new or upgraded software and systems prior to authorization to operate on production enclaves.</p> <p>Sandia / SETA Capability Research Architecture Cell (CRAC) identifies, investigates, explores, evaluates, and tests prototypes of emerging and cutting edge information technology that provides superior advantage to analysts and warfighters. Sandia / CRAC builds partnerships with mission partners in DoD, IC, IA, Academia, National Labs and Industry to support, develop and integrate plans, programs, requirements, resources, technology and innovations across the mission spectrum for DTRA. Facilitates innovation, acceleration of programs, rapid response to emerging events, and rapid development and operationalization of new technologies.</p> <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> - Extend current DTRA Mission IT capability (Vantage), which supports Force Protection and Mission Planning, with augmented reality and virtual reality technologies (Examples include: HoloLens and Oculus Rift). - Create new 3D visualizations for underwater/Bathymetric datasets to support maritime operations and mitigate new improvised threats. - Integrate C-sUAS geo-spatial enabled data from the cloud architecture (Catapult) with VMS developed applications such as Foxhole to better visualize the effectiveness of proposed C-sUAS systems and optimize 	10.978	9.797	0.000	10.090	10.090

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>C-sUAS system placement in tactical/operational environments.</p> <ul style="list-style-type: none"> - Integrate machine learning for automated geo-spatial feature extraction creating time efficiencies in support of Request for Support (RFS) product delivery to include line of sight analysis, threat vulnerability assessments, and blast modeling. - Develop inter-operability with geo-spatial applications/models across the 70+ production facing developed tool suite. Examples include integrating advanced geo-spatial models with multi-INT data through Team Phoenix developed capabilities to include Voltron Horizon tool. - Integrate new Data Science environment, which will spawn graph analytics, machine learning, and neural networks against the 126M unique documents resident within Catapult. - Cross corpus entity resolution and correlation to identify similar entities across multiple reports and reporting types resident within the Catapult architecture/data lake. This will include techniques to track specific Catapult entities across time and their locations mentioned in relevant reporting. These new techniques will expand DTRA's ability to identify and track improvised threat networks through automation. - Create a set of data preparation micro-services to build an efficient pipeline for incorporation of Catapult data into future Data Science algorithms and experiments. - Enhance location precision and categorization of Catapult-extracted locations to provide more accurate geospatial plotting of relevant locations. Improvements to Natural Language Processing extraction of location information through supplementing extracted locations with relevant attributes derived from the context of the report. <p>FY 2021 Base Plans: N/A</p> <p>FY 2021 OCO Plans:</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. 					

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<ul style="list-style-type: none"> - 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 MIT developed 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. - Enable collaborative VR capabilities to assist mission planning and force protection by extending existing VR capabilities to enable multi-user support and shared walkthroughs of 3D models. - Determine the best techniques to shrink neural network algorithms to work on low power and small computer platforms such as cameras or SUASs (Real-time Processing at the Edge wrapping up in early FY 2021). - Determine the capabilities that go beyond simple content identification and labeling, and move toward understanding the story and context of the video or image (Computer Vision for Improvised Threats). - 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 AI/ML solutions. <p><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> The slight increase from FY 2020 to FY 2021 is due to the growing number of requests for services, emerging threats, and technologies, user-base supported, and advancements in technology.</p>					
Accomplishments/Planned Programs Subtotals	10.978	9.797	0.000	10.090	10.090

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

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2021</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u>	
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	<u>Total Cost</u>
• 10/0602134BR/JS: <i>Counter Improvised-Threat Advanced Studies</i>	0.000	1.175	0.000	1.199	1.199	1.223	1.247	1.272	1.297	Continuing	Continuing

Remarks

D. Acquisition Strategy

Assessment and selection of best performer to provide contractual services to develop and operationalize requirements through the new Enterprise Acquisition Strategy Initiative (EASI) 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 2021 Defense Threat Reduction Agency **Date:** February 2020

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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Attack the Network Suite (MIT) - Systems Integration Lab (SIL) - Direct Operations Support	C/CPAF	Booz Allen Hamilton : Reston, VA	1.199	1.236	Aug 2019	0.000		-		-		-	0.000	2.435	2.435
Attack the Network Suite (MIT) - Systems Integration Lab (SIL) - Mission IT Capability Development (Automation and Data Science)	C/CPAF	Booz Allen Hamilton : Reston, VA	1.799	1.854	Aug 2019	0.000		-		-		-	0.000	3.653	3.653
Sandia	MIPR	Sandia National Laboratories : Reston, VA	0.032	0.031	Oct 2018	0.040	Oct 2019	0.000		0.041	Oct 2020	0.041	Continuing	Continuing	-
IRTM	MIPR	Office of Naval Research : Arlington, VA	0.257	0.000		-		-		-		-	0.000	0.257	0.257
Network	C/FFP	John Hopkins : Baltimore, MD	1.815	0.000		-		-		-		-	0.000	1.815	1.815
Vehicle-Borne IED (VBIED)	C/CPFF	Naval Surface Warfare Command : Dahlgren, VA	8.500	0.000		-		-		-		-	0.000	8.500	8.500
Catapult Information System	C/CPAF	Booz Allen Hamilton : Reston, VA	-	-		5.218	Aug 2020	0.000		5.374	Aug 2021	5.374	Continuing	Continuing	-
Subtotal			13.602	3.121		5.258		0.000		5.415		5.415	Continuing	Continuing	N/A

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Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Attack the Network Suite (MIT) - Systems Integration Lab (SIL) - Direct Operations Support	C/CPAF	Booz Allen Hamilton : Reston, VA	0.400	0.412	Aug 2019	-		-		-		-	0.000	0.812	0.812
Attack the Network Suite (MIT) - Systems Integration Lab (SIL) - Mission IT Capability Development (Automation and Data Science)	C/CPAF	Booz Allen Hamilton : Reston, VA	0.599	0.618	Aug 2019	0.000		-		-		-	0.000	1.217	1.217
QRC IT Network (OIR)	C/CPAF	Booz Allen Hamilton : Reston, VA	-	1.366	Mar 2019	0.090	Mar 2020	0.000		0.093	Mar 2021	0.093	Continuing	Continuing	-
QRC IT Network (RS)	C/CPAF	Booz Allen Hamilton : Reston, VA	-	0.258	Mar 2019	0.090	Mar 2020	0.000		0.093	Mar 2021	0.093	Continuing	Continuing	-
Sandia	MIPR	Sandia National Laboratories : Reston, VA	0.097	0.129	Oct 2018	0.120	Oct 2019	0.000		0.122	Oct 2020	0.122	Continuing	Continuing	-
Catapult Information System Support	C/CPAF	Zel Technologies : Reston, VA	0.319	0.550	Sep 2019	0.500	Mar 2020	0.000		0.515	Mar 2021	0.515	Continuing	Continuing	-
Carnegie Mellon University-Software Engineering Institute (CMU-SEI)	MIPR	Carnegie Mellon University/SEI : Hanscomb AFB, MA	0.215	0.000	Mar 2019	0.000		-		-		-	0.000	0.215	0.215
Subtotal			1.630	3.333		0.800		0.000		0.823		0.823	Continuing	Continuing	N/A

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Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Attack the Network Suite (MIT) - Systems Integration Lab (SIL) - Direct Operations Support	C/CPAF	Booz Allen Hamilton : Reston, VA	0.400	0.412	Aug 2019	0.000		-		-		-	0.000	0.812	0.812
Attack the Network Suite (MIT) - Systems Integration Lab (SIL) - Mission IT Capability Development (Automation and Data Science)	C/CPAF	Booz Allen Hamilton : Reston, VA	0.599	0.618	Aug 2019	0.750		0.000		0.774	Aug 2020	0.774	Continuing	Continuing	-
QRC IT Network (OIR)	C/CPAF	Booz Allen Hamilton : Reston, VA	-	1.078	Mar 2019	0.234	Mar 2020	0.000		0.241	Mar 2021	0.241	Continuing	Continuing	-
QRC IT Network (RS)	C/CPAF	Booz Allen Hamilton : Reston, VA	-	1.030	Mar 2019	0.234	Mar 2020	0.000		0.241	Mar 2021	0.241	Continuing	Continuing	-
Catapult Information System	C/CPAF	Booz Allen Hamilton : Reston, VA	-	-		0.917	Aug 2020	0.000		0.944	Aug 2021	0.944	Continuing	Continuing	-
Sandia	MIPR	Sandia National Laboratories : Reston, VA	0.194	0.184	Oct 2018	0.240	Oct 2019	0.000		0.247	Oct 2020	0.247	Continuing	Continuing	-
SETA Capability Research Architecture Cell (CRAC)	C/CPAF	Zel Technologies : Reston, VA	1.079	1.202	Sep 2019	1.364	Sep 2020	0.000		1.405	Sep 2021	1.405	Continuing	Continuing	-
Subtotal			2.272	4.524		3.739		0.000		3.852		3.852	Continuing	Continuing	N/A

Remarks

In this R-3, FY 2020 was updated to reflect increased visibility of Catapult's execution plans as a Program of Record.

	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	17.504	10.978	9.797	0.000	10.090	10.090	Continuing	Continuing	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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	FY 2012				FY 2013				FY 2014				FY 2015				FY 2016				FY 2017				FY 2018			
	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
Assist Situational Understanding																												
Attack the Network Suite (MIT) - Systems Integration Lab (SIL) - Direct Operations Support																												
Attack the Network Suite (MIT) - Systems Integration Lab (SIL) - Mission IT Capability Development (Automation and Data Science)																												
QRC IT Network (OIR)																												
QRC IT Network (RS)																												
Sandia																												
SETA Capability Research Architecture Cell (CRAC)																												
Catapult / CTN Tool Suite Program of Record Support																												

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
Assist Situational Understanding																												
Attack the Network Suite (MIT) - Systems Integration Lab (SIL) - Direct Operations Support																												
Attack the Network Suite (MIT) - Systems Integration Lab (SIL) - Mission IT Capability Development (Automation and Data Science)																												
QRC IT Network (OIR)																												
QRC IT Network (RS)																												

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Defense Threat Reduction Agency **Date:** February 2020

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	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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

Sandia																												
SETA Capability Research Architecture Cell (CRAC)																												
Catapult / CTN Tool Suite Program of Record Support																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Defense Threat Reduction Agency		Date: February 2020
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Assist Situational Understanding</i>				
Attack the Network Suite (MIT) - Systems Integration Lab (SIL) - Direct Operations Support	4	2016	4	2020
Attack the Network Suite (MIT) - Systems Integration Lab (SIL) - Mission IT Capability Development (Automation and Data Science)	4	2016	4	2025
QRC IT Network (OIR)	2	2017	2	2025
QRC IT Network (RS)	2	2017	2	2025
Sandia	1	2020	1	2025
SETA Capability Research Architecture Cell (CRAC)	4	2016	4	2025
Catapult / CTN Tool Suite Program of Record Support	4	2016	4	2025