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Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force **Date:** April 2022

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0207573F / <i>National Technical Nuclear Forensics</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	-	0.380	1.971	2.039	0.000	2.039	2.044	2.045	0.000	0.000	0.000	8.479
674881: <i>Prompt Diagnostics</i>	-	0.380	1.971	2.039	0.000	2.039	2.044	2.045	0.000	0.000	0.000	8.479
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

National Technical Nuclear Forensics (NTNF) is the collection, analysis and evaluation of pre- and post-detonation radiological and nuclear materials, devices, and debris as well as the immediate effects created by a nuclear detonation.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver National Technical Nuclear Forensics weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F. In PY 0M was expended for civilian pay expenses in this program element, and in CY 0M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

B. Program Change Summary (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	0.395	1.971	0.000	0.000	0.000
Current President's Budget	0.380	1.971	2.039	0.000	2.039
Total Adjustments	-0.015	0.000	2.039	0.000	2.039
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-0.015	0.000	2.039	0.000	2.039

Change Summary Explanation

FY22: Added funds to increase capabilities of United States Prompt Diagnostic System within the National Technical Nuclear Forensics programs.

FY23: The FY 2022 President's Budget submittal did not reflect FY 2023 through FY 2026 funding. Therefore, an explanation of the change between the two budget positions for FY2023 cannot be made in a relevant manner.

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

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<p>Title: Nuclear Forensics - Prompt Diagnostics</p> <p>Description: Develop diagnostic detection systems to immediately record signals resulting from a nuclear detonation. These event signature elements support weapon and event characterization analysis for the purposes of identifying the weapon classification, magnitude of the detonation (yield), and Reaction Time History (RTH) of the device. The combination of these elements with radiochemical analysis enables analysts to distinguish between wide ranges of nuclear weapon designs and origin, supporting the national attribution assessment process.</p> <p>FY 2022 Plans:</p> <ul style="list-style-type: none"> - Increase Technology Readiness Levels for Ground Based Optical Skyshine (GBOS). - Advanced Technology Development for fielded prototype sensor for form, fit, function for speed of light and speed of sound sensor technologies. - Analytical Tool Development for data analyst in support of Reaction Time History. - Analytical Tool Development for data analyst in support of Yield Determination. - Engineering and manufacturing systems development maturation and integration activities for the USPDS system suite. - Prompt Diagnostics Operational System Development for fielded systems to validated sensor production and system integration. - Development & Implementation of backward software compatibility for system configuration to provide flexibility and operations during software or hardware upgrades. <p>FY 2023 Base Plans:</p> <ul style="list-style-type: none"> - Will Continue advancing Technology Readiness Levels for Ground Based Optical Skyshine (GBOS). - Will Continue Advanced Technology Development for fielded prototype sensor for form, fit, function for speed of light and speed of sound sensor technologies. - Will Continue Analytical Tool Development for data analyst in support of Reaction Time History. - Will Continue Analytical Tool Development for data analyst in support of Yield Determination. - Will Continue Engineering and manufacturing systems development maturation and integration activities for the USPDS system suite. - Will Continue Prompt Diagnostics Operational System Development for fielded systems to validated sensor production and system integration. 	0.380	1.971	2.039	0.000	2.039

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
- Will Continue Development & Implementation of backward software compatibility for system configuration to provide flexibility and operations during software or hardware upgrades.					
FY 2023 OCO Plans: N/A					
FY 2022 to FY 2023 Increase/Decrease Statement: Funding decreased due to higher priority Air Force needs.					
Accomplishments/Planned Programs Subtotals	0.380	1.971	2.039	0.000	2.039

D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023 Base</u>	<u>FY 2023 OCO</u>	<u>FY 2023 Total</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• OPAF 03 Line Item 834320: <i>National Technical Nuclear Forensics</i>	5.202	4.000	5.987	-	5.987	3.992	7.125	7.272	7.300	Continuing	Continuing

Remarks

E. Acquisition Strategy

The RDT&E strategy was developed in concert with the system stakeholders. The strategy is to utilize (1) Department of Energy Sensor R&D Principal Investigators (PI's) who developed the prototype systems for the USPDS program (2) Department of Energy National Security Campus who during the DSOR was identified as Engineering, Production Integration and Depot for the Life Cycle of the system (3) AFTAC Subject Matter Experts and Operator/End Users for the system. The planned acquisition will predominantly require funds transfers via Military Interdepartmental Procurement Requests (MIPRs). Prioritization and implementation of Acquisitions to support RDT&E for the system will be managed and prioritized quarterly by the USPDS R&D Requirements Review Board (RRB) and chaired by Air Combat Command (ACC/A5) as per the charter signed by the stakeholders. The strategy will utilize performance based techniques with the performance based on a statement of objectives to describe the overall output of the acquisition task.

- i. Air Combat Command (ACC) - Requirement Owner
- ii. Air Force Life Cycle Management Center - MDA, PEO, Procurement
- iii. Air Force Technical Applications Center (AFTAC) - SME, Operator, Maintainer
- iv. National Security Campus - Kansas City Plant (NSC-KCP) - Engineering, Integration, Depot

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force **Date:** April 2022

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0207573F / <i>National Technical Nuclear Forensics</i>	Project (Number/Name) 674881 / <i>Prompt Diagnostics</i>
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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			
Nuclear Forensics - Prompt Diagnostics	MIPR	National Laboratory : multiple	-	-		1.971	Apr 2022	2.039	Mar 2023	-		2.039	Continuing	Continuing	-
Subtotal			-	-		1.971		2.039		-		2.039	Continuing	Continuing	N/A

Remarks
Kansas City Nuclear Security Campus will work with several National Laboratories for reachback/collaboration on efforts.

Management Services (\$ 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			
Management Services	C/CPAF	Not specified. : TBD	-	0.380	Dec 2020	-		-		-		-	Continuing	Continuing	-
Subtotal			-	0.380		-		-		-		-	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			-	0.380	1.971	2.039	-	2.039	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2023 Air Force		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

United States Prompt Diagnostics System (USPDS) Phase II	
- Phase 2: Complete Technical Data Package, Configuration Status Accounting, and Product Support Analysis/Logistics Product Data	██████████
USPDS Sensor/User Tool Development	
Ground Based Optical Skyshine (GBOS)	████████████████████
Speed of Light Sensor Advanced Technology Development	██
Speed of Light Sensor Advance Technology Development	██
Reaction Time History and Yield Tool Development	██

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Air Force		Date: April 2022
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>United States Prompt Diagnostics System (USPDS) Phase II</i>				
- Phase 2: Complete Technical Data Package, Configuration Status Accounting, and Product Support Analysis/Logistics Product Data	1	2021	4	2021
<i>USPDS Sensor/User Tool Development</i>				
Ground Based Optical Skyshine (GBOS)	1	2022	4	2023
Speed of Light Sensor Advanced Technology Development	1	2022	4	2025
Speed of Light Sensor Advance Technology Development	1	2022	4	2025
Reaction Time History and Yield Tool Development	4	2022	4	2025