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 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0605294D8Z / *Trusted and Assured Microelectronics*							
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	154.133	170.849	107.513	113.895	-	113.895	-	-	-	-	-	-
812: *Trusted Mask Trust Approach*	2.000	2.000	0.000	0.000	-	0.000	-	-	-	-	-	-
809: *New Trust Approach Demonstration*	72.479	13.381	0.000	0.000	-	0.000	-	-	-	-	-	-
822: *Microelectronics Innovation for National Security and Economic Competitiveness (MINSEC) Enhancement and Demonstration*	79.654	155.468	0.000	0.000	-	0.000	-	-	-	-	-	-
902: *Access to State-of-the-Art (SOTA) Microelectronics - Demonstration*	0.000	0.000	54.045	51.298	-	51.298	-	-	-	-	-	-
903: *Access to Advanced Packaging and Testing - Demonstration*	0.000	0.000	39.040	41.797	-	41.797	-	-	-	-	-	-
905: *Address DoD Unique Needs Especially Radiation Hardening - Demonstration*	0.000	0.000	14.428	20.800	-	20.800	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This Program Element (PE) supports microelectronics modernization activities that enable defense systems to keep pace with commercial microelectronics technological advances, reduce reliance on obsolete microelectronics, and mitigate the Department's reliance on sole source foundries for assured state-of-the-art (SOTA) microelectronics. It addresses the challenges of 1) having enduring access to a multiplicity of modern manufacturing processes that require commercial volumes to maintain long term viability and 2) protecting the intellectual property (IP) of the microelectronic parts that are manufactured.

This PE supports the 2018 National Defense Strategy's (NDS) line of effort to build a more lethal force through modernization of key capabilities, the NDS defense objective of establishing an unmatched twenty-first century National Security Innovation Base that effectively supports Department operations and sustains security and solvency, and the NDS strategic approach of reforming the Department's business practices by simultaneously increasing performance and affordability while still minimizing risk.

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 I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605294D8Z *I Trusted and Assured Microelectronics*

This Program Element supports the OUSD(R&E) Microelectronics Modernization Roadmap. The primary areas of focus of this roadmap include the following: access to state-of-the-art (SOTA) microelectronics technology, access to advanced packaging and test; quantifiable assurance and secure design; foundry access; verification and validation; policies, standards, and Joint Federated Assurance Center (JFAC) governing body; access to radiation hardened microelectronics; access to non-complementary metal oxide semiconductor (CMOS) SOTA microelectronics; disruptive research and development; education and workforce development; trusted foundry and obsolescence; and supply chain awareness and security.

Recognizing that an assured supply of microelectronics is a U.S. Government (USG)-wide concern, this activity will interface with interagency partners to take into account interagency requirements, opportunities for collaboration, and strategic decisions that can be made to limit the overall cost of these requirements to the USG.

This activity is being led by the Under Secretary of Defense for Research and Engineering.

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	175.032	107.585	115.315	-	115.315
Current President's Budget	170.849	107.513	113.895	-	113.895
Total Adjustments	-4.183	-0.072	-1.420	-	-1.420
• Congressional General Reductions	-	-0.072			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-4.153	-			
• Program Adjustment	-	-	-1.420	-	-1.420
• Cancelled Account Reduction	-0.030	-	-	-	-

Change Summary Explanation

In FY 2021, Project Code 812 "Trusted Mask" was eliminated. Project 809 "New Trust Demonstration" and Project Code 822 "Microelectronics Innovation for National Security and Economic Competitiveness (MINSEC)" activities were re-aligned under three new project codes to correctly align Program Element (PE) funding in support of a Quantifiable Assurance philosophy and reflective of current priorities. The new project codes are: (1) Project Code 902 Access to State-of-the-Art (SOTA) Microelectronics - Demonstration; (2) Project Code 903 Access to Advanced Packaging and Testing - Demonstration; and (3) Project Code 905 Address DoD Unique Needs Especially Radiation Hardening - Demonstration.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense			Date: May 2021
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605294D8Z / *Trusted and Assured Microelectronics*	Project (Number/Name) 812 / *Trusted Mask Trust Approach*	

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
812: *Trusted Mask Trust Approach*	2.000	2.000	0.000	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project staffs and supports operation of a new secure (SECRET-level) photomask manufacturing capability at an existing state-of-the-art (SOTA) commercial photomask manufacturing supplier to secure masks and design intellectual property (IP) of acquisition programs during photomask data preparation, parsing and manufacturing. This capability can be used in conjunction with both Trusted and untrusted foundries. This capability will mitigate a supply chain gap for trusted masks at technology node sizes between 130 nanometers (nm) and 12/14nm.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Trusted Mask Trust Approach ***Description:*** Funding for this effort ended in FY 2020.	2.000	-	-
Accomplishments/Planned Programs Subtotals	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 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 812 / *Trusted Mask Trust Approach*

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
Trusted Mask Trust Approach	MIPR	Defense Microelectronics Activity (DMEA) : California	2.000	2.000	Mar 2020	-		-		-		-	-	-	-
		Subtotal	2.000	2.000		-		-		-		-	-	-	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	2.000	2.000		0.000		-		-		-	-	-	N/A

Remarks

NA

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 812 / *Trusted Mask Trust Approach*

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
Trusted mask facility operation																												
Trusted mask facility operation	[redacted]																											

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 812 / *Trusted Mask Trust Approach*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Trusted mask facility operation				
Trusted mask facility operation	1	2020	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense			Date: May 2021
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605294D8Z / *Trusted and Assured Microelectronics*	Project (Number/Name) 809 / *New Trust Approach Demonstration*	

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
809: *New Trust Approach Demonstration*	72.479	13.381	0.000	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2021, P809 funds transferred from this project code (Pcode) to new P902 “Access to SOTA Microelectronics Demonstration” to properly align funding in support of the Quantifiable Assurance philosophy and reflect current priorities.

A. Mission Description and Budget Item Justification

This project funds a program of research to demonstrate the next generation, technology-driven approach to microelectronics trust and assurance, to include state-of-the-art (SOTA) microelectronics, to ensure continued access to SOTA microelectronic technologies, while maintaining the required level of assurance in all environments. DoD’s ability to access commercial technology for its custom secure, trusted and assured needs is diminishing as SOTA suppliers become fewer and more focused on serving the global commercial market. DoD’s technology needs are broad, and relying on a single source supplier is not feasible. Alternative, advanced manufacturing methods, technologies, and design tools are needed to produce secure, trusted and assured SOTA parts from commercial sources and to preserve access to these advanced nodes while protecting DoD and Defense Industrial Base (DIB) intellectual property (IP) from exploitation. It is also intended to dramatically improve the capabilities of the core trusted and assured microelectronics (T&AM) laboratories with regard to verification and validation in support of microelectronics assurance.

This program of research will demonstrate quantitative and innovative design, manufacturing, imaging, tagging, and control and assessment approaches for protecting DoD’s microelectronics supply chain and IP. Furthermore a quantitative assurance methodology using metrics from assurance mitigations will be demonstrated to enable access to SOTA microelectronics. Assurance mitigations will be demonstrated for Field Programmable Gate Array devices in advanced technology nodes for next-generation strategic systems, obfuscation and disaggregation technologies, and other assurance mitigations. It will demonstrate advanced imaging technologies and forensics, Design for Assurance techniques, active hardware assurance controls, electronic component markers, and a data and analysis capability to enable auditing, lifecycle provenance and traceability, and independent verification and validation of commercial and specialized DoD designs and IP. It also demonstrates and implements concepts for the cost-effective production of custom microelectronics in low volumes and protection of sensitive IP from exploitation. In addition it demonstrates and implements new technologies to assess the security of field-programmable gate array (FPGA) assurance mechanisms.

Assurance technologies that can be applied in a broad range of trusted and commercial environments can mitigate the risks associated with sole-source suppliers, and increase the ability of the U.S. Government (USG) to leverage commercial capabilities. The suite of demonstrated technologies, e.g., alternative manufacturing methods and design tools, will enable DoD to obfuscate the purpose of sensitive devices, verify their origin and function, and protect sensitive IP from exploitation even while using the global supply chain for most hardware. In cases where the risk involved precludes that level of commercial collaboration, low-volume manufacturing technologies demonstrated under this project would permit DoD to more cheaply produce low volumes of sensitive microelectronics in secure environments. The project

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 809 / *New Trust Approach Demonstration*

will also support demonstration of a repository of third-party IP and electronic design automation (EDA) and assurance tool marketplace to expedite circuit design and transition promising technologies to use.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: New Trust Approach Demonstration	13.381	-	-
Accomplishments/Planned Programs Subtotals	13.381	-	-

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 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 809 / *New Trust Approach Demonstration*

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
New Trust Approach Demonstration Program Support	MIPR	Various (Defense Advanced Research Projects Agency, Air Force, Army, Navy, National Security Agency) : Various	72.479	13.381	Mar 2020	-		-		-		-	-	-	-
		Subtotal	72.479	13.381		-		-		-		-	-	-	N/A

Remarks

NA

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	72.479	13.381		0.000		-		-		-	-	-	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 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 809 / *New Trust Approach Demonstration*

	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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
New Trust Approach Demonstration																												
Field programmable gate array (FPGA) integrated assurance analysis/logical and physical verification tool demonstration	■	■	■	■																								
Automated design and verification and demonstration	■	■	■	■																								
Validation of custom integrated circuits and demonstration	■	■	■	■																								
Cloud hardware emulation/virtual instrumentation	■	■	■	■																								
Third party intellectual property (IP) and electronic design automation (EDA) tool repository development and demonstration	■	■	■	■																								
Technical capability improvement development and demonstration	■	■	■	■																								
Microelectronics assurance and supply chain demonstrations	■	■	■	■																								
U.S. Government and industry engagement for demonstration of data driven quantifiable assurance tools, techniques, and risk based metrics	■	■	■	■																								
Microelectronics assurance and supply chain policy and guidance development/update	■	■	■	■																								
Management/Technical Support	■	■	■	■																								

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 809 / *New Trust Approach Demonstration*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
New Trust Approach Demonstration				
Field programmable gate array (FPGA) integrated assurance analysis/logical and physical verification tool demonstration	1	2020	4	2020
Automated design and verification and demonstration	1	2020	4	2020
Validation of custom integrated circuits and demonstration	1	2020	4	2020
Cloud hardware emulation/virtual instrumentation	1	2020	4	2020
Third party intellectual property (IP) and electronic design automation (EDA) tool repository development and demonstration	1	2020	4	2020
Technical capability improvement development and demonstration	1	2020	4	2020
Microelectronics assurance and supply chain demonstrations	1	2020	4	2020
U.S. Government and industry engagement for demonstration of data driven quantifiable assurance tools, techniques, and risk based metrics	1	2020	4	2020
Microelectronics assurance and supply chain policy and guidance development/update	1	2020	4	2020
Management/Technical Support	1	2020	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense			Date: May 2021
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605294D8Z / *Trusted and Assured Microelectronics*	Project (Number/Name) 822 / *Microelectronics Innovation for National Security and Economic Competitiveness (MINSEC) Enhancement and Demonstration*	

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
822: *Microelectronics Innovation for National Security and Economic Competitiveness (MINSEC) Enhancement and Demonstration*	79.654	155.468	0.000	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2021, Project Code (Pcode) 822 funds transferred from this Pcode to new Pcodes to correctly align Program Element (PE) funding in support of the Quantifiable Assurance philosophy and reflect current priorities. They are: P902 - Access to SOTA Microelectronics; P903 - Access to Advanced Packaging and Test; and P905 - Address DoD Unique Needs.

A. Mission Description and Budget Item Justification

This project supports the DoD microelectronics strategy by ensuring the availability of and access to the advanced, assured microelectronics that are critical for DoD and national security systems. It will deliver tools to protect the IP confidentiality and integrity for a broad range of systems and missions and will provide a path for the production of these articles.

This project supports a broader national strategy to focus resources, policies, and incentives to enhance current and next generation defense capability by:
1) maintaining access to U.S. domestic production of state-of-the-art (SOTA) technology;
2) enabling solutions for DoD heterogeneous integration and advanced packaging needs;
3) leveraging commercial technology through demonstrations with industry of dual-use technologies with built in assurance, and incentivizing stronger commercial engagement through piloting acquisition reforms and providing incentives for cooperative R&D and trade;
4) enhancing state-of-the-practice (SOTP) foundries in the U.S. to produce more advanced technologies to better serve low-volume customers in the aerospace and defense community;
5) accelerating the transition and capture of the next generation of microelectronics through commercial partnerships and lowering domestic barriers to innovation in coordination with the Defense Advanced Research Projects Agency (DARPA) Electronics Resurgence Initiative (ERI); and
6) promoting threat awareness, proactive protection, and supply chain security to ensure these investments continue to benefit the U.S.

MINSEC activities are categorized into the following focus areas: access to specialized SOTA and dual use microelectronics technology, collection and analysis of data for metrics driven quantifiable assurance, maintaining and enhancing U.S. capability though capture and secure, and transition of next generation microelectronics

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 822 / *Microelectronics Innovation for National Security and Economic Competitiveness (MINSEC) Enhancement and Demonstration*

technology including demonstration and capability insertion; microelectronics-focused workforce training; radiation hardening by process (RHBP) and radiation hardening by design (RHBD) in advanced technology nodes for next-generation strategic systems; and radio frequency (RF) and optoelectronic (OE) microelectronics.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Microelectronics Innovation for National Security and Economic Competitiveness (MINSEC) ***Description:*** This project's activities will mature and evaluate quantifiable microelectronics access and assurance technologies and techniques through efforts that may include the conduct of studies and Broad Agency Announcements (BAAs) and other efforts to coordinate research programs across USG R&D organizations, academia, and industry.	155.468	-	-
Accomplishments/Planned Programs Subtotals	155.468	-	-

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 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 822 / *Microelectronics Innovation for National Security and Economic Competitiveness (MINSEC) Enhancement and Demonstration*

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
Microelectronics Innovation for National Security and Economic Competitiveness (MINSEC) Innovation and Development	MIPR	Defense Advanced Research Projects Agency, Air Force, Army, Navy, National Security Agency : Various	79.654	155.468	Mar 2020	-		-		-		-	-	-	-
		Subtotal	79.654	155.468		-		-		-		-	-	-	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	79.654	155.468		0.000		-		-		-	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 822 / *Microelectronics Innovation for National Security and Economic Competitiveness (MINSEC) Enhancement and Demonstration*

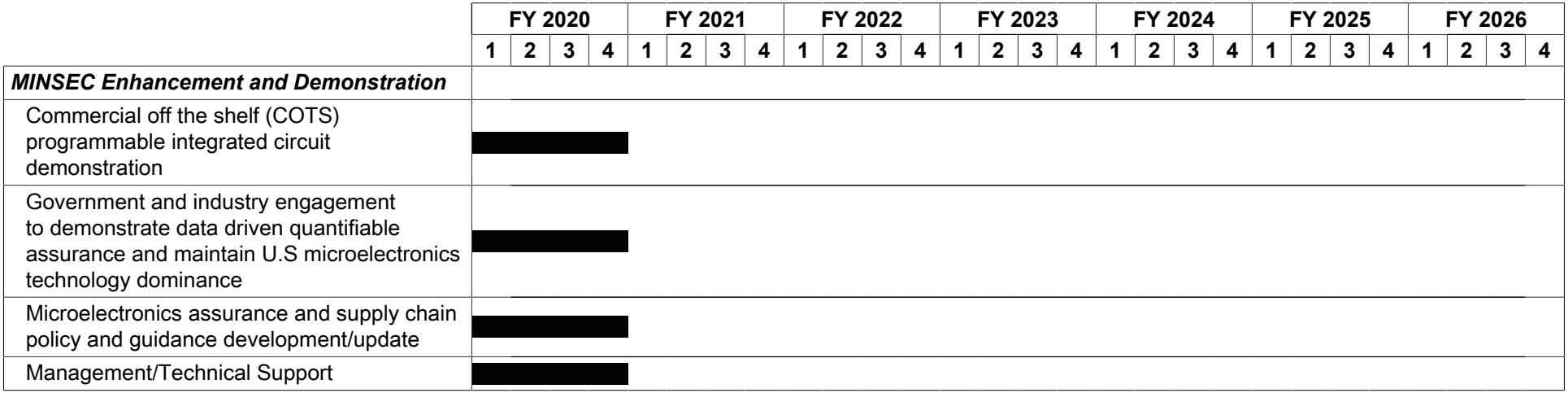

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 822 / *Microelectronics Innovation for National Security and Economic Competitiveness (MINSEC) Enhancement and Demonstration*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MINSEC Enhancement and Demonstration				
Commercial off the shelf (COTS) programmable integrated circuit demonstration	1	2020	4	2020
Government and industry engagement to demonstrate data driven quantifiable assurance and maintain U.S microelectronics technology dominance	1	2020	4	2020
Microelectronics assurance and supply chain policy and guidance development/update	1	2020	4	2020
Management/Technical Support	1	2020	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense			Date: May 2021
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605294D8Z / *Trusted and Assured Microelectronics*	Project (Number/Name) 902 / *Access to State-of-the-Art (SOTA) Microelectronics - Demonstration*	

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
902: *Access to State-of-the-Art (SOTA) Microelectronics - Demonstration*	0.000	0.000	54.045	51.298	-	51.298	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In 2021, this project incorporates portions of projects P809 and P822. It will establish multiple strategic partnerships with existing commercial state-of-the-art (SOTA) domestic foundries to develop a data-driven, risk-based approach to supply chain protection and demonstrate the assured manufacture of advanced electronic components.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Design	-	16.000	0.000

Description: The enhancement will demonstrate quantifiably assured design concepts in manufactured systems, enabling a formal risk-based approach to protection techniques. Manufactured microelectronics will be tested to ensure that IP protections meet or exceed current National Security Agency (NSA) standards for intellectual property (IP) protection, and to demonstrate DoD's ability to detect certain malicious supply chain attacks on DoD microelectronics.

The enhancement will also demonstrate a new data driven quantifiable assurance paradigm for supply chain protection. It will strengthen security while improving access, exposing no sensitive IP to the foundry and requiring post-manufacture validation of foundry products. The enhancement will demonstrate quantifiably assured design concepts in manufactured systems, enabling a formal risk-based approach to protection techniques. Manufactured microelectronics will be tested to ensure that IP protections meet or exceed current NSA standards for IP protection, and to demonstrate DoD's ability to detect certain malicious supply chain attacks on DoD microelectronics.

Successful implementation will transition these technologies to use in DoD programs, obtain access to multiple commercial microelectronics facilities, and solidify a data-driven approach to supply chain protection, including keeping pace with the rapid advancements in microelectronics technology and the globalization of this industry sector. It will provide the basics for updating and strengthening DoD assurance policy and includes collaborating with industry to employ data driven quantifiable standards.

FY 2021 Plans:

Planned activities are as follows:

• Demonstrate vetted IP repository, which will be available for DoD use of assured tools distributed via cloud services.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 902 / *Access to State-of-the-Art (SOTA) Microelectronics - Demonstration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
• Achieve initial operational capability (IOC) for secure co-design capabilities and supply chain tools using commercially-available cloud-based services with/at co-development partners for commercial IP. • Demonstrate enhanced secure design and cloud capability with new tools and techniques. • Continue to build-out secured design environments and persistent technical expertise. ***FY 2022 Plans:*** These efforts are being merged into a combined program for both secure design and quantifiable assurance activities beginning with FY 2022. See “Secure Design and Quantifiable Assurance Demonstration” program below. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** These efforts are being merged into a combined program for both secure design and quantifiable assurance activities beginning with FY 2022. See “Secure Design and Quantifiable Assurance Demonstration” program below.			
Title: Foundry ***Description:*** This activity will implement multiple foundries process design kit (PDK) environments ensuring the government is not dependent on one single source for critical components. Demonstrate hardware through dedicated and multi-project wafer runs at multiple foundries. Commercial foundries generate enormous amounts of data on their processes as a best practice for quality assurance to improve reliability and increase yield. It will collect and utilize this data to generate and allow quantitative comparison of performance and security metrics in the design and test stage of the microelectronics lifecycle, thereby mitigating risk. ***FY 2021 Plans:*** Planned activities are as follows: • Demonstrate assured access to multiple SOTA domestic fabrication sources. • Continued build-out of secured design environments and persistent expertise. ***FY 2022 Plans:*** Planned activities are as follows: • Continued build-out of secured design environments and persistent expertise. • Conduct additional domestic SOTA fabrication demonstrations. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Changes reflect minor budget fluctuations.	-	3.834	4.000
Title: Secure Design and Quantifiable Assurance Demonstration	-	34.211	47.298

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 902 / *Access to State-of-the-Art (SOTA) Microelectronics - Demonstration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022

Description: This activity includes verifying the ability to fabricate classified and/or export-controlled designs in on-shore commercial foundries– funding will establish multiple strategic partnerships with existing commercial domestic foundries to develop a data-driven, risk-based approach to supply chain protection and demonstrate the assured manufacture of advanced electronic components.

The project will demonstrate the technical means for protecting IP and obfuscating the final user function from the supply chain will be realized using personalization, programmability and software, following application specific integrated circuit (ASIC) manufacturing. Efforts are on-going to update International Traffic in Arms Regulations (ITAR) and Export Administration Regulations (EAR) policy in this area. Funding will support activities to enhance the export control regime so that it maintains or strengthens current protections while enabling access to commercial capabilities, products, and IP.

FY 2021 Plans:
Planned activities are as follows:
• Conduct enhanced IP demonstration and analysis of data driven risk assessments using independent verification and validation (V&V), data captures, intelligence reports, probability of detection and false alarm rates, and game theoretics.
• Demonstrate scalable classified system for a design and verification ecosystem.
• Establishment and demonstration of commercial field programmable gate array (FPGA) screening capability.
• Continue to establish, demonstrate, and evaluate new quantifiable assurance technologies for FPGA devices.
• Align stakeholders with common concerns to demonstrate assurance enabled SOTA fabrication technologies.

FY 2022 Plans:
Planned activities are as follows:
• Enhance repositories with commercial and DoD relevant design IP for multi-foundry access
• Continue to demonstrate enhanced secure design and cloud capability with new tools and techniques.
• Continue to build-out secured design environments and persistent technical expertise and
• Enable enterprise licensing to tools and IP for rapid and scaled access to leading end technology.
• Conduct enhanced IP demonstration and analysis of data driven risk assessments using independent verification and validation (V&V), data captures, intelligence reports, probability of detection and false alarm rates, and game theoretics.
• Demonstrate rapid transition of DoD-relevant field programmable gate array-based capabilities to structured ASICs, with security capabilities to protect DoD intellectual property (IP) during manufacture.
• Deploy integrated circuit deep inspection capability and conduct integrated circuit personalization demonstration.
• Conduct additional foundry quantifiably assured fabrication demonstrations.

FY 2021 to FY 2022 Increase/Decrease Statement:

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 902 / *Access to State-of-the-Art (SOTA) Microelectronics - Demonstration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Changes reflect minor budget fluctuations.			
Accomplishments/Planned Programs Subtotals	-	54.045	51.298

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

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 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 902 / *Access to State-of-the-Art (SOTA) Microelectronics - Demonstration*

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
Access to State-of-the-Art (SOTA) Microelectronics - Demonstration	MIPR	Defense Advanced Research Projects Agency, Air Force, Army, Navy, National Security Agency : Various	-	-		54.045	Mar 2021	51.298	Mar 2022	-		51.298	Continuing	Continuing	-
		Subtotal	-	-		54.045		51.298		-		51.298	Continuing	Continuing	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		54.045		51.298		-		51.298	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 902 / *Access to State-of-the-Art (SOTA) Microelectronics - Demonstration*

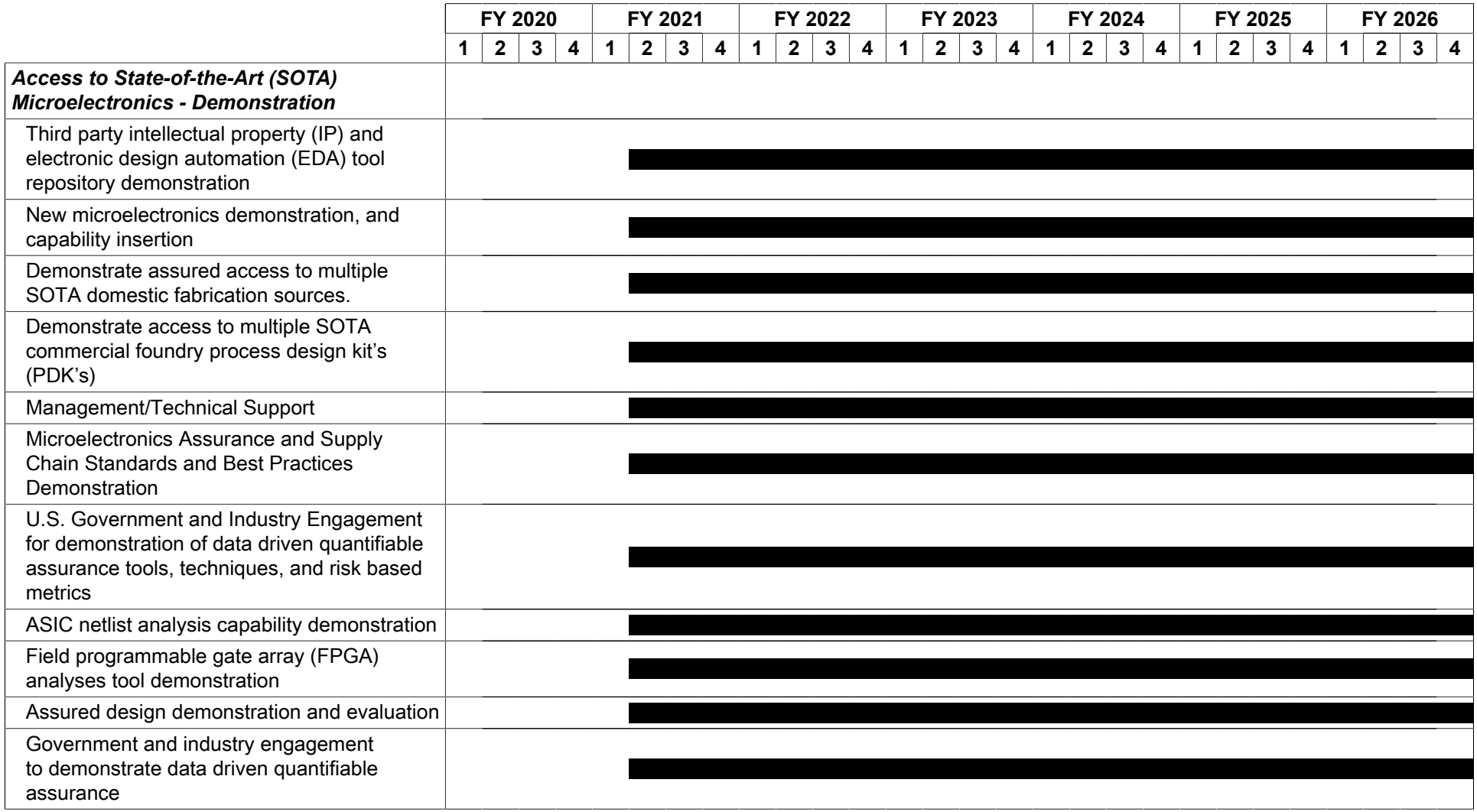

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 902 / *Access to State-of-the-Art (SOTA) Microelectronics - Demonstration*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Access to State-of-the-Art (SOTA) Microelectronics - Demonstration				
Third party intellectual property (IP) and electronic design automation (EDA) tool repository demonstration	2	2021	4	2026
New microelectronics demonstration, and capability insertion	2	2021	4	2026
Demonstrate assured access to multiple SOTA domestic fabrication sources.	2	2021	4	2026
Demonstrate access to multiple SOTA commercial foundry process design kit's (PDK's)	2	2021	4	2026
Management/Technical Support	2	2021	4	2026
Microelectronics Assurance and Supply Chain Standards and Best Practices Demonstration	2	2021	4	2026
U.S. Government and Industry Engagement for demonstration of data driven quantifiable assurance tools, techniques, and risk based metrics	2	2021	4	2026
ASIC netlist analysis capability demonstration	2	2021	4	2026
Field programmable gate array (FPGA) analyses tool demonstration	2	2021	4	2026
Assured design demonstration and evaluation	2	2021	4	2026
Government and industry engagement to demonstrate data driven quantifiable assurance	2	2021	4	2026

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense			Date: May 2021
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605294D8Z / *Trusted and Assured Microelectronics*	Project (Number/Name) 903 / *Access to Advanced Packaging and Testing - Demonstration*	

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
903: *Access to Advanced Packaging and Testing - Demonstration*	0.000	0.000	39.040	41.797	-	41.797	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project will leverage existing commercially available expertise and capability to deliver self-sustaining digital and radio frequency (RF) state-of-the-art (SOTA) heterogeneous integrated packaging (SHIP), assembly, and test capability.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Access to Advanced Packaging and Testing - Demonstration	-	39.040	41.797
Description: This project will deliver an on-shore SHIP assembly and test capability. It will provide access to, personalization of, and customization for supporting DoD programs. It will enable a revolutionary leap in system performance that will greatly reduce size, weight and power (SWaP) by incorporating the immense advances in SOTA commercial off the shelf (COTS) processing technologies, such as field programmable gate arrays (FPGAs), microprocessors, and Graphic Processing Units (GPUs). ***FY 2021 Plans:*** Planned activities are as follows: • Demonstrate enhanced secure design and secure packaging with new tools and techniques. • Continue demonstration of heterogeneous integration for secure packaging and test. ***FY 2022 Plans:*** Planned activities are as follows: • Continue to demonstrate enhanced secure design and secure packaging with new tools and techniques. • Continue demonstration of heterogeneous integration for secure packaging and test. • Demonstrate prototype hardware and additional program-driven designs of increasing complexity and capability/performance. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Changes reflect minor budget fluctuations			
Accomplishments/Planned Programs Subtotals	-	39.040	41.797

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 903 / *Access to Advanced Packaging and Testing - Demonstration*

C. Other Program Funding Summary ($ in Millions)

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 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 903 / *Access to Advanced Packaging and Testing - Demonstration*

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
Access to Advanced Packaging and Testing - Demonstration	MIPR	Defense Advanced Research Projects Agency, Air Force, Army, Navy, National Security Agency : Various	-	-		39.040	Mar 2021	41.797	Mar 2022	-		41.797	Continuing	Continuing	-
		Subtotal	-	-		39.040		41.797		-		41.797	Continuing	Continuing	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		39.040		41.797		-		41.797	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 903 / *Access to Advanced Packaging and Testing - Demonstration*

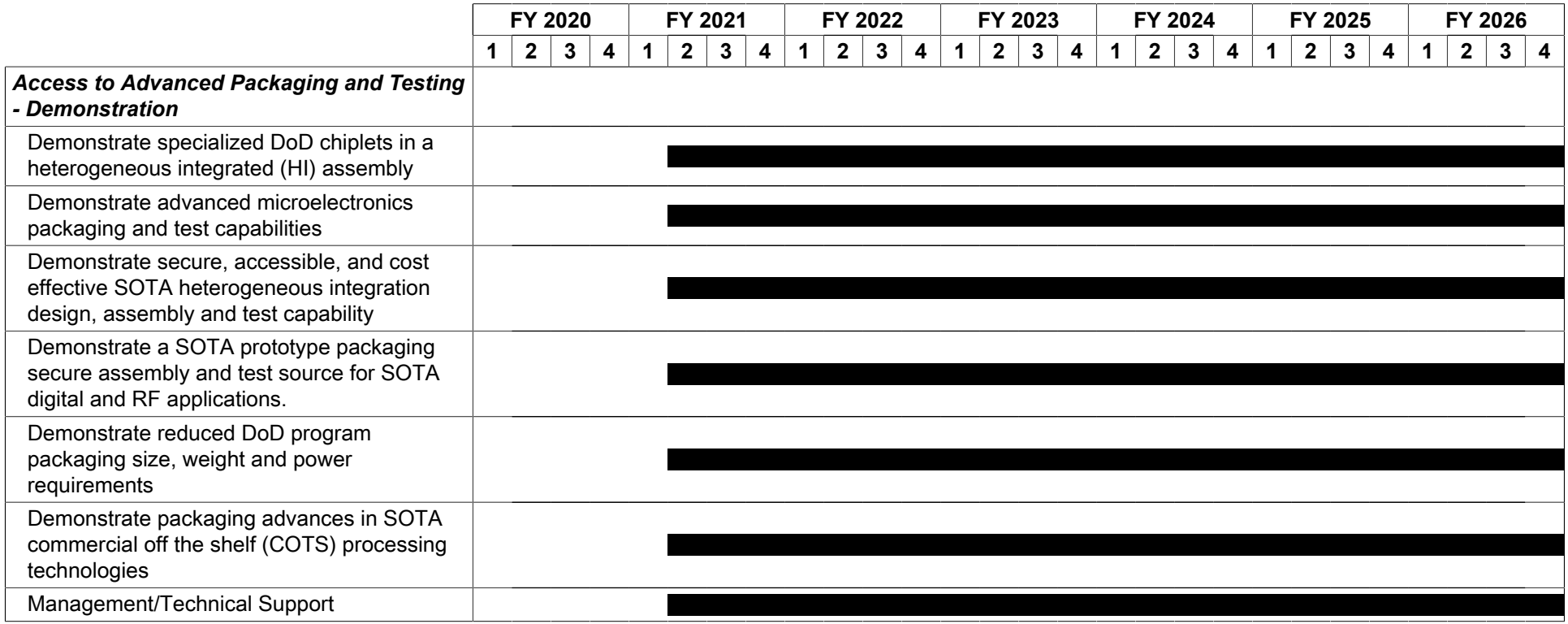

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 903 / *Access to Advanced Packaging and Testing - Demonstration*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Access to Advanced Packaging and Testing - Demonstration				
Demonstrate specialized DoD chiplets in a heterogeneous integrated (HI) assembly	2	2021	4	2026
Demonstrate advanced microelectronics packaging and test capabilities	2	2021	4	2026
Demonstrate secure, accessible, and cost effective SOTA heterogeneous integration design, assembly and test capability	2	2021	4	2026
Demonstrate a SOTA prototype packaging secure assembly and test source for SOTA digital and RF applications.	2	2021	4	2026
Demonstrate reduced DoD program packaging size, weight and power requirements	2	2021	4	2026
Demonstrate packaging advances in SOTA commercial off the shelf (COTS) processing technologies	2	2021	4	2026
Management/Technical Support	2	2021	4	2026

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense			Date: May 2021
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605294D8Z / *Trusted and Assured Microelectronics*	Project (Number/Name) 905 / *Address DoD Unique Needs Especially Radiation Hardening - Demonstration*	

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
905: *Address DoD Unique Needs Especially Radiation Hardening - Demonstration*	0.000	0.000	14.428	20.800	-	20.800	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project addresses the dual problems of commanding only a small market share while requiring an expansive range of unique microelectronics needs, from boutique and legacy components to state-of-the-art (SOTA) technologies. The Government must sustain specialty suppliers, given their criticality to national security. In particular, DoD needs access to a diverse microelectronics ecosystem to develop and acquire the application specific integrated circuit (ASICs) and personalized commercial off the shelf (COTS) components required for military radiation hardened and radio frequency and optical needs.

The Department frequently relies on commercial suppliers to optimize performance and reduce costs for sophisticated weapon system and secure network functionality. It is critical that DoD has future access to subject matter expertise, technology, and manufacturing.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Address DoD Unique Needs Especially Radiation Hardening - Demonstration	-	14.428	20.800
Description: Government-unique trusted design and manufacturing flows have been developed to enable a tier of trust for select ASIC parts; however, this approach addresses only a small subset of DoD microelectronics requirements (e.g., processors, memory, microcontrollers, field programmable gate arrays (FPGAs), and radiation-tolerant processors). DoD will partner with the intelligence community, the Department of Energy, and the National Aeronautics and Space Administration to demonstrate radiation hardened components that permit systems to operate in space and other harsh environments. State-of-the-practice (SOTP) and SOTA technologies will be characterized and developed in support of Radiation Hardened By Process (RHBP) and Radiation Hardened By Design (RHBD) activities in support DoD modernization programs with radiation hardened requirements. A similar situation exists for radio frequency and optical applications. These two applications reflect only a small market with unique costs and specifications, which does not inherently create incentive for industrial investment.			
FY 2021 Plans: Planned activities are as follows:			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 905 / *Address DoD Unique Needs Especially Radiation Hardening - Demonstration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
• Demonstrate enhanced DoD Lab test and evaluation infrastructure required for verification and validation of radiation hardened microelectronics, technology characterization, and device modeling and simulation. • Demonstrate advanced radiation hardened System on Chip (SOC) and memory technology in support of DoD program modernization efforts with radiation hardened requirements. • Demonstrate SOTP and SOTA technologies utilizing Radiation Hardened By Process (RHBP) and Radiation Hardened By Design (RHBD) activities in support of DoD modernization programs with radiation hardened requirements. • Provide coordination and subject matter expertise in support of the Strategic Radiation Hardened Electronics council (SRHEC) for the identification of technology gaps, technology roadmap development, and inform future investments. • Procure and evaluate advanced Gallium Nitride (GaN) substrates to establish an assured source. • Demonstrate assured GaN radio frequency (RF) foundry technology and host secure design challenges to optimize SOTA radio frequency optoelectronics (RFOE) intellectual property (IP) and test articles for frequency, bandwidth, efficiency, power, etc. • Major milestones will be GaN wafer deliveries and assured GaN RF circuits via Secure Design Challenge. • Continue to enhance the foundations of assurance for RF and optoelectronics (OE) applications by demonstrating new capabilities such as additive manufacturing. ***FY 2022 Plans:*** Planned activities are as follows: • Continue to demonstrate SOTP and SOTA technologies utilizing RHBP and RHBD activities in support of DoD modernization programs with radiation hardened requirements. • Transition developed RH technologies into space and strategic programs. • Conduct light detection and ranging (LiDAR) technology demonstration in conjunction with the Defense Advanced Research Projects Agency. • Operationally demonstrate advanced RFOE module prototypes and IP for programs of record. • Demonstrate and transition advanced RFOE modules to DoD programs, while enhancing US leadership in foundational Defense Industrial Base markets. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding increased to properly align funding in support of the Quantifiable Assurance philosophy and reflect current priorities.			
Accomplishments/Planned Programs Subtotals	-	14.428	20.800

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 905 / *Address DoD Unique Needs Especially Radiation Hardening - Demonstration*

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 / 5	R-1 Program Element (Number/Name) PE 0605294D8Z / *Trusted and Assured Microelectronics*	Project (Number/Name) 905 / *Address DoD Unique Needs Especially Radiation Hardening - Demonstration*	

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
Address DoD Unique Needs - Demonstration	MIPR	Defense Advanced Research Projects Agency, Air Force, Army, Navy, National Security Agency : Various	-	-		14.428	Mar 2021	20.800	Mar 2022	-		20.800	Continuing	Continuing	-
		Subtotal	-	-		14.428		20.800		-		20.800	Continuing	Continuing	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		14.428		20.800		-		20.800	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 905 / *Address DoD Unique Needs Especially Radiation Hardening - Demonstration*

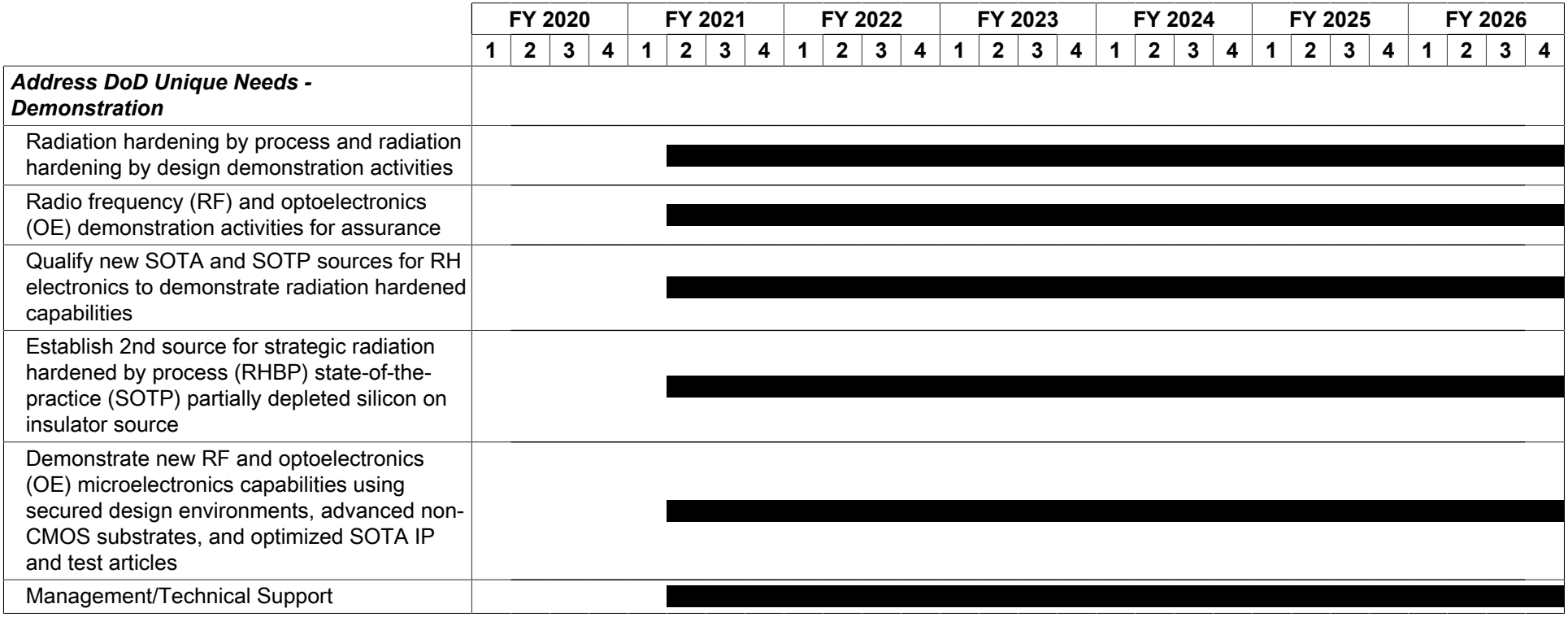

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605294D8Z / *Trusted and Assured Microelectronics*	**Project (Number/Name)** 905 / *Address DoD Unique Needs Especially Radiation Hardening - Demonstration*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Address DoD Unique Needs - Demonstration				
Radiation hardening by process and radiation hardening by design demonstration activities	2	2021	4	2026
Radio frequency (RF) and optoelectronics (OE) demonstration activities for assurance	2	2021	4	2026
Qualify new SOTA and SOTP sources for RH electronics to demonstrate radiation hardened capabilities	2	2021	4	2026
Establish 2nd source for strategic radiation hardened by process (RHBP) state-of-the-practice (SOTP) partially depleted silicon on insulator source	2	2021	4	2026
Demonstrate new RF and optoelectronics (OE) microelectronics capabilities using secured design environments, advanced non-CMOS substrates, and optimized SOTA IP and test articles	2	2021	4	2026
Management/Technical Support	2	2021	4	2026