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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2024 Office of the Secretary Of Defense **Date:** March 2023

<b>Appropriation/Budget Activity</b> 0403D: <i>Creating Helpful Incentives To Produce Semi-Conductors (CHIPS) for America / BA 3: Advanced Technology Development (ATD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603669D8Z / <i>Microelectronics Commons</i>
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	0.000	269.256	269.256	-	269.256	265.108	260.731	264.648	0.000	Continuing	Continuing
829: <i>Microelectronics Research Maturation – Prototyping</i>	-	0.000	267.923	267.923	-	267.923	255.775	242.953	254.426	0.000	Continuing	Continuing
830: <i>Workforce Development – Prototyping</i>	-	0.000	1.333	1.333	-	1.333	9.333	17.778	10.222	0.000	Continuing	Continuing

**Note**

Funding begins in FY 2023 as provided in the Creating Helpful Incentives to Produce Semiconductors (CHIPS) Act of 2022 appropriation, not in the FY 2023 annual Defense appropriation.

**A. Mission Description and Budget Item Justification**

This program supports the Department's initiatives to Build Sustainable and Long-Term Advantage, Defend the Homeland, and Deter Aggression.

The Office of the Under Secretary of Defense for Research and Engineering (OUSDR&E) is standing up the Microelectronics (ME) Commons activity pursuant to the Fiscal Year (FY) 2021 National Defense Authorization Act (NDAA) (Pub. L. 116-283), including the CHIPS (Creating Helpful Incentives to Produce Semiconductors) for America Act, and funded through the CHIPS for America Defense Fund established by the CHIPS Act of 2022. The FY 2021 NDAA legislation significantly emphasizes solutions that promote the domestic on-shoring of capabilities to address economic and technology security concerns. Under FY 2021 NDAA Sec. 9903(b), DoD is directed to establish a National Network for Microelectronics Research and Development (NNMRD) to enable the laboratory-to-fabrication transition of microelectronics innovations in the United States and to expand the global leadership in microelectronics of the United States. Specifically, DoD is addressing a component of the NNMRD, the ME Commons, through a public-private partnership consisting of regional innovation hubs distributed across the U.S. to foster a pipeline of innovative ideas and talent residing in university labs and small business R&D teams.

**Background**

U.S. technological dominance in ME materials, processes, devices, and architectural designs can only be sustained through the development of a robust domestic innovation ecosystem that fosters the rapid development and transition of novel concepts into commercially viable manufacturing processes. The U.S. innovation ecosystem has long been the driver of our nation's technology leadership throughout the world. U.S. R&D kick-started the enormous semiconductor industry and continues to lead the world in developing the next generation of disruptive technologies including: new materials, devices, circuits, architectures, and design tools.

In recent years, the efficient domestic adoption of U.S. chip innovation has been threatened as emerging hardware technologies have become increasingly reliant on offshore sources for State of the Art (SOTA) manufacturing, prototyping, and investment. There are several significant hurdles that hardware startups face, including limited or expensive access to necessary facilities and design infrastructure, high costs of design intellectual property, limited expertise with hardware engineering, and high costs of prototyping. As a result, the number of U.S. hardware startups has dropped significantly and foreign investment in U.S.-based technology startups has enabled offshore fabrication and maturation of emerging technologies.

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<b>Appropriation/Budget Activity</b> 0403D: <i>Creating Helpful Incentives To Produce Semi-Conductors (CHIPS) for America / BA 3: Advanced Technology Development (ATD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603669D8Z / <i>Microelectronics Commons</i>
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To address these needs, OUSD(R&E) is standing up the ME Commons as a public private partnership, consisting of regional innovation hubs distributed across the U.S. to foster a pipeline of innovative ideas and talent residing in university labs and small business R&D teams. The partnership will provide resources for and access to specialized lab equipment, technical expertise, and connections to existing or upgraded low-volume prototyping facilities. These low-volume fabrication and packaging facilities will help mature promising technologies and demonstrate the manufacturing and economic benefits of these innovations for dual-use application for defense and commercial sectors.

The ME Commons will focus on critical, on-shore prototyping to transition innovation from universities, start-ups, and small companies to manufacturing. Key features are:

- Creates and connects “Lab-to-Fab” testing/prototyping hubs to form a network focused on maturing emerging microelectronics technologies
- Provides broad access to these prototyping hubs, potentially by augmenting academic facilities and enabling access to facilities within local semiconductor companies or FFRDCs.
- Facilitates ME education and training of students at local colleges and universities, and provide a potential pipeline to bolster local semiconductor economies and contribute more broadly to the growth of a domestic semiconductor workforce.

This program element focuses on the technology development activities of the ME Commons, including staffing at ME Commons hub facilities, advanced technology development, and significant prototyping activity. In addition, it provides for the establishment, staffing, and operation of the Microelectronics Commons Management Company (MCMC), the overall management of the ME Commons, needed ME design ecosystem components (software licenses, cloud design services, etc.) and an ME wafer brokerage that will support the entire Commons network.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	269.256	269.256	-	269.256
Total Adjustments	0.000	269.256	269.256	-	269.256
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• CHIPS Act of 2022 Appropriation	-	269.256	269.256	-	269.256

**Change Summary Explanation**

This PE is funded by the CHIPS for America Defense Fund special appropriation established by the CHIPS Act of 2022, not the annual Defense appropriation. The CHIPS Act appropriates funds for this effort from FY 2023 through 2027.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Office of the Secretary Of Defense										<b>Date:</b> March 2023		
<b>Appropriation/Budget Activity</b> 0403D / 3					<b>R-1 Program Element (Number/Name)</b> PE 0603669D8Z / <i>Microelectronics Commons</i>				<b>Project (Number/Name)</b> 829 / <i>Microelectronics Research Maturation – Prototyping</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
829: <i>Microelectronics Research Maturation – Prototyping</i>	-	0.000	267.923	267.923	-	267.923	255.775	242.953	254.426	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This project focuses on the advanced technology development activities of the ME Commons including prototyping of devices or components using new ME materials, processes, device designs, and architectural designs.

It will also enable the establishment and operation of an independent Microelectronics Commons Management Company (MCMC), which will provide efficient coordination and administration of regional innovation hubs. The MCMC will be tasked with selecting and operating the ME Commons network, in alignment with the OUSD(R&E) feedback and vision to ensure DoD access to and benefit from resulting technologies. The MCMC will conduct the competition to select ME Commons Hubs (see below) from existing entities and operate them in collaboration with local management. The MCMC will provide oversight responsibility to facilitate the administrative, legal, and business functions of the Hubs, and will report directly to the government-designated program manager. The MCMC will also coordinate and manage regional Hub access to shared resources such as licenses for electronic design automation (EDA) tools and cutting-edge fabrication facilities. This eliminates the need for each regional Hub to establish relationships with foundries and EDA tool vendors and avoids duplication of efforts across the network.

The project also supports the establishment of the ME Commons Hubs, which will be new strategic partnerships with existing academic facilities and research labs. The Hubs will be augmented to enhance intrinsic specializations in emerging areas of ME. This project supports the establishment of strategic relationships with Core facilities, which are existing state-of-the-art ME productions facilities (foundries or fabs). The Cores will be connected to the regional Hubs and open to all ME Commons users.

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

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<b>Title:</b> Microelectronics Research Maturation – Prototyping	0.000	267.923	267.923
<b>Description:</b> This effort focuses on the development and prototyping of promising new ME materials, processes, devices, and architectural designs with potential DoD applications, and development of these technologies. It will also support the selection and stand-up of the Microelectronics Commons Management Company (MCMC). Finally, it will support initial selection and operation of regional ME Commons Hubs and network-wide ME Commons Cores, in conjunction with activities funded by PEs 0602669D8Z and 0604669D8Z.			
<b>FY 2023 Plans:</b>			
<ul style="list-style-type: none"> <li>• Select and stand up Microelectronics Commons Management Company (MCMC) to manage and coordinate the ME Commons network</li> </ul>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Office of the Secretary Of Defense		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 0403D / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603669D8Z / <i>Microelectronics Commons</i>	<b>Project (Number/Name)</b> 829 / <i>Microelectronics Research Maturation – Prototyping</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
and activities • Secure agreements for Commons design ecosystem components, including EDA licenses, ME Intellectual Property (IP) blocks, cloud design services, etc. • Establish ME Commons wafer brokerage, including logistics and legal framework. • Initiate wafer brokerage operations, including cost of foundry wafers and mask sets • Select initial ME Commons Hubs and Cores through MCMC • Initiate development and prototyping efforts for new ME technologies with potential DoD or dual-use applications  <b><i>FY 2024 Plans:</i></b> • Operate and maintain the MCMC • Maintain for Commons design ecosystem components (EDA licenses, IP blocks, etc.) • Continue and expand wafer brokerage operations, including cost of foundry wafers and mask sets • Select remaining ME Commons Hubs to build out ME Commons network • Continue and expand development and prototyping efforts for new ME technologies with potential DoD or dual-use applications  <b><i>FY 2023 to FY 2024 Increase/Decrease Statement:</i></b> N/A			
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	267.923	267.923

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2024 Office of the Secretary Of Defense			<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 0403D / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603669D8Z / <i>Microelectronics Commons</i>	<b>Project (Number/Name)</b> 829 / <i>Microelectronics Research Maturation – Prototyping</i>	

FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
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

<b><i>Microelectronics Research Maturation – Prototyping</i></b>	
Microelectronics Commons Management Company (MCMC)	
Commons design ecosystem (EDA licenses, IP blocks, cloud design services, etc.)	
Commons wafer brokerage	
Commons Hubs and Cores	
Development and prototyping efforts	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2024 Office of the Secretary Of Defense		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 0403D / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603669D8Z / <i>Microelectronics Commons</i>	<b>Project (Number/Name)</b> 829 / <i>Microelectronics Research Maturation – Prototyping</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Microelectronics Research Maturation – Prototyping</i></b>				
Microelectronics Commons Management Company (MCMC)	1	2023	4	2028
Commons design ecosystem (EDA licenses, IP blocks, cloud design services, etc.)	1	2023	4	2028
Commons wafer brokerage	1	2023	4	2028
Commons Hubs and Cores	1	2023	4	2028
Development and prototyping efforts	1	2023	4	2028

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<b>Appropriation/Budget Activity</b> 0403D / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603669D8Z / <i>Microelectronics Commons</i>	<b>Project (Number/Name)</b> 830 / <i>Workforce Development – Prototyping</i>
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
<i>830: Workforce Development – Prototyping</i>	-	0.000	1.333	1.333	-	1.333	9.333	17.778	10.222	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

This project focuses on workforce development activities that are inherent to the operation of the ME Commons, particularly in the advanced technology development phase. It will facilitate ME education and training of students at local colleges and universities that are part of the Commons network, and provide a pipeline to bolster local semiconductor economies and contribute more broadly to the growth of a domestic semiconductor workforce.

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

	FY 2022	FY 2023	FY 2024
<b>Title:</b> Workforce Development – Prototyping	0.000	1.333	1.333
<b>Description:</b> This effort will directly support workforce development activities through the ME Commons network through technology development and prototyping activities. Activities include establishment of PhD internships and post-doc training at Hub facilities and internships at Core facilities. Additionally, it will develop training for the existing ME Commons workforce with potential for impact beyond the entities participating directly in the ME Commons Core and Hub entities.			
<b>FY 2023 Plans:</b>			
<ul style="list-style-type: none"> <li>• Develop and establish internships and post-doc training programs for Hub facilities</li> <li>• Develop and establish internships for Core facilities</li> <li>• Develop training for existing non-student ME Commons workforce</li> </ul>			
<b>FY 2024 Plans:</b>			
<ul style="list-style-type: none"> <li>• Continue and expand internships and post-doc training programs for Hub facilities</li> <li>• Continue and expand internships for Core facilities</li> <li>• Continue and expand training for existing non-student ME Commons workforce</li> </ul>			
<b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> N/A			
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	1.333	1.333

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

N/A

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

**Remarks**

**D. Acquisition Strategy**

N/A



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2024 Office of the Secretary Of Defense		<b>Date:</b> March 2023
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Workforce Development – Prototyping</i></b>				
Internships and post-doc training programs for Hub facilities	1	2023	4	2028
Internships for Core facilities	1	2023	4	2028
Training for existing non-student ME Commons workforce	1	2023	4	2028