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 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603833D8Z / *Engineering Science and Technology (S&T)*

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	83.444	18.900	0.000	0.000	-	0.000	-	-	-	-	-	-
401: *DoD Modeling and Simulation Management Office*	23.173	4.701	0.000	0.000	-	0.000	-	-	-	-	-	-
402: *Systems Engineering Research Center*	18.216	4.782	0.000	0.000	-	0.000	-	-	-	-	-	-
403: *Engineered Resilient Systems*	42.055	9.417	0.000	0.000	-	0.000	-	-	-	-	-	-

Note

In FY 2021, funding realigned to the Systems Engineering (SE) Program Element (0605142D8Z) to support enhanced engineering expertise and assessments for mission-oriented prototypes focused on modernization priorities, and a reduction for other DoD priorities.

A. Mission Description and Budget Item Justification

This Program Element (PE) advances engineering state of the practice, and complex defense systems challenges through development of engineering capabilities to improve acquisition quality. Engineering science and technology, including systems engineering (SE) research, supports the cost-effective acquisition of complex systems.

This PE increases lethality and supports Department business reform (National Defense Strategy Lines of Effort one and three respectively). Improvements to the Department's systems engineering capabilities ensure we quickly and affordably field a lethal Joint Force by addressing dependencies in system and mission capabilities, rapidly evolving technologies, lifecycle considerations, and resource limitations in the face of dynamic threats and missions.

In FY 2021, DoD Modeling and Simulation Management Office (MSMO) funding Modeling and Simulation (M&S) activities transition to Systems Engineering (Program Element 0605142D8Z).

The Systems Engineering Research Center (SERC) is a University Affiliated Research Center (UARC) established in 2008 as a strategic resource to conduct systems research and improve the Department’s ability to develop and deploy complex weapon systems. The SERC consists of a network of 22 research universities from across the U.S. working collaboratively to bring the best academic talent in the nation to bear on DoD’s systems engineering research problems.

The Engineered Resilient Systems (ERS) project reduces the risk in development of future weapon systems and ensures warfighter success through better-informed acquisition decisions. ERS integrates high-fidelity, physics-based modeling with advanced analytic tools to enable rapid design and analysis of current and future weapon systems. Through the use of high-performance computing, optimized computational tools, and improved processes and methods, ERS enables faster evaluation of system performance, systems-of-systems analysis, and system evaluation within operationally relevant environments to complement and reduce costly

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 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603833D8Z / *Engineering Science and Technology (S&T)*

physical testing. In order to focus ERS efforts on the Department's modernization priorities, in FY 2021, ERS project funding transitions to Systems Engineering (Program Element 0605142D8Z). With further ERS advances from a development project to an enduring support capability, this shift better aligns with the purpose of research funded by projects associated with Systems Engineering. This change directly orients the previously developed capabilities to address modernization efforts driven by the National Defense Strategy.

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	19.376	0.000	0.000	-	0.000
Current President's Budget	18.900	0.000	0.000	-	0.000
Total Adjustments	-0.476	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.473	-			
• Program Adjustments	-0.003	-	-	-	-

Change Summary Explanation

In FY 2021, funding realigned to the Systems Engineering (SE) Program Element (0605142D8Z) to support enhanced engineering expertise and assessments for mission-oriented prototypes focused on modernization priorities, and a reduction for other DoD priorities.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense			Date: May 2021
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603833D8Z / *Engineering Science and Technology (S&T)*	Project (Number/Name) 401 / *DoD Modeling and Simulation Management Office*	

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
401: *DoD Modeling and Simulation Management Office*	23.173	4.701	0.000	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2021, DoD Modeling and Simulation Management Office transitions to Systems Engineering (Program Element 0605142D8Z).

A. Mission Description and Budget Item Justification

The Office of the Under Secretary of Defense for Research and Engineering (OUSD(R&E)) designated the DoD Modeling and Simulation Management Office (MSMO) to be the focal point and advocate for Defense M&S to enhance the Defense modeling and simulation (M&S) Enterprise by (1) enabling cooperation and collaboration in identifying, developing and sustaining modeling and simulation solutions; and (2) promoting technology solutions, including common M&S architectures, standards, and services that improve interoperability, reuse, and cost effectiveness of DoD M&S.

MSMO is responsible for:
• Planning, coordinating, and managing funds to support enterprise-level joint and cross-cutting M&S activities that guide the Defense M&S Community to achieve the DoD Strategic Vision for M&S.
• Bringing together M&S stakeholders to advise and assist on finding solutions for removing the barriers to interoperability, reuse, commonality, efficiency, and effectiveness.
• Developing, coordinating, and advocating for policy/guidance, technology, standards, best practices, and strategic planning processes that promote interoperability and reuse across the Department.

MSMO also serves as DoD's:
• Focal point and advocate for coordinating M&S information exchanges and interactions within DoD, with other U.S. Government departments and agencies, international allies, industry, and academia to promote sharing of information and practices, synergy of efforts, and M&S as a key enabler of all organizations' missions.
• Lead Standardization Activity (LSA) for managing M&S standards and methodologies.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: DoD Modeling and Simulation Management Office (MSMO)	4.701	-	-
Description: MSMO, as the OUSD(R&E)-designated focal point for Defense modeling and simulation (M&S), is responsible for maintaining and enhancing policies, standards, technology, and collaboration to ensure the efficiency and effectiveness of the M&S that supports the full range and scope of DoD missions and operations.			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense		Date: May 2021
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603833D8Z / *Engineering Science and Technology (S&T)*	**Project (Number/Name)** 401 / *DoD Modeling and Simulation Management Office*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
FY 2020 funds used to transition the MSMO capabilities into the general body of systems engineering policy and practice as well as focus on other research and engineering priorities. In FY 2021, MSMO transitions to Systems Engineering (Program Element 0605142D8Z).			
Accomplishments/Planned Programs Subtotals	4.701	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense			Date: May 2021
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603833D8Z / *Engineering Science and Technology (S&T)*	Project (Number/Name) 402 / *Systems Engineering Research Center*	

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
402: *Systems Engineering Research Center*	18.216	4.782	0.000	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2021, funding for the Systems Engineering Research Center is reduced and realigned to Systems Engineering (Program Element 0605142D8Z) to support Integration, Technology, and Tools.

A. Mission Description and Budget Item Justification

The Systems Engineering Research Center (SERC) is a University Affiliated Research Center (UARC) established in 2008 as a strategic resource to conduct systems research and improve the Department's ability to develop and deploy complex weapon systems.

The SERC's network of universities is led by the Stevens Institute of Technology, and includes the Air Force Institute of Technology, Auburn University, Carnegie Mellon University, Georgetown University, Georgia Institute of Technology, Massachusetts Institute of Technology, Missouri University of Science and Technology, Naval Postgraduate School, North Carolina Agricultural and Technical State University, Old Dominion University, Pennsylvania State University, Purdue University, Texas A&M University, University of Alabama, University of Maryland, University of Massachusetts, University of South Florida, University of Southern California, University of Virginia, Virginia Polytechnic Institute, and Wayne State University. These universities work collaboratively to bring the best talent in the nation to bear on DoD's systems engineering research problems.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Systems Engineering Research Center	4.782	-	-
Description: The SERC is a DoD UARC which conducts University-based research that directly supports DoD's National Defense Strategy through development of new systems engineering methods, processes, and tools. In FY 2021, SERC transitions to Systems Engineering (Program Element 0605142D8Z).			
Accomplishments/Planned Programs Subtotals	4.782	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense			Date: May 2021
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603833D8Z / *Engineering Science and Technology (S&T)*	Project (Number/Name) 403 / *Engineered Resilient Systems*	

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
403: *Engineered Resilient Systems*	42.055	9.417	0.000	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2021, Engineered Resilient Systems (ERS) funding and mission realigns to Systems Engineering (Program Element 0605142D8Z) to support enhanced engineering expertise and assessments for mission-oriented prototypes that address modernization priorities.

A. Mission Description and Budget Item Justification

ERS integrates high-fidelity, physics-based modeling with advanced analytic tools to enable rapid design and analysis of current and future weapon systems. Through the use of high-performance computing, optimized computational tools, and improved processes and methods, ERS enables faster evaluation of system performance, systems-of-systems analysis, and system evaluation within operationally relevant environments to complement and reduce costly physical testing. In FY 2021, ERS project funding transitions to Systems Engineering (Program Element 0605142D8Z), with further ERS research funded by projects associated with the modernization priorities. This change directly orients the previously developed capabilities to address modernization efforts driven by the National Defense Strategy.

ERS products are engineering design visualization and tool integration frameworks that integrate physics-based models and engineering tools to greatly improve the ability to perform tradespace and requirements analysis, optimize designs, and evaluate system performance.

ERS leverages multi-fidelity physics-based models developed by the S&T community to inform the acquisition decision process, e.g., increased/easier use of high-performance computing, analyses of massive data sets, and lifecycle cost sensitivity analysis.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Engineered Resilient Systems (ERS)	9.417	-	-
Description: The ERS project directly supports the DoD modernization priorities by delivering computational engineering tools for performance analysis, modeling and simulation, tradespace assessment, and data analysis and visualization. These engineering tools support in-depth analyses that validate new technology solutions during critical acquisition engineering activities prior to major acquisition milestones. In FY 2021, ERS transitions to Systems Engineering (Program Element 0605142D8Z).			
Accomplishments/Planned Programs Subtotals	9.417	-	-

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 / 3	**R-1 Program Element (Number/Name)** PE 0603833D8Z / *Engineering Science and Technology (S&T)*	**Project (Number/Name)** 403 / *Engineered Resilient Systems*

C. Other Program Funding Summary ($ in Millions)

Remarks

N/A

D. Acquisition Strategy

N/A