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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 6: RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0606017F / <i>Requirements Analysis and Maturation</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	-	88.259	109.513	89.956	0.000	89.956	53.974	44.458	45.319	46.668	Continuing	Continuing
666157: <i>Development Planning</i>	-	22.177	13.446	14.065	0.000	14.065	14.271	14.582	14.839	15.092	Continuing	Continuing
666158: <i>INTEGRATED SIMULATION AND ANALYSIS</i>	-	66.082	96.067	75.891	0.000	75.891	39.703	29.876	30.480	31.576	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Requirements Analysis and Maturation (RAM) program funds development planning (DP) to include early systems engineering and integrated simulation and analysis. These activities include requirements analysis, capability decomposition and trade space characterization, concept development (joint and cross-Service, family of systems, system of systems, air, space, and cyber), architecture design, cost analysis, modeling and simulation of representative or prototype systems, model validation, analytical tool development, and focused capability risk reduction. Outcomes of development planning activities include: technologically informed requirements; mature concepts that are technically feasible, operationally relevant, and militarily useful; and recommendations for science and technology (S&T) investment to reduce technical risks. Development planning activities provide the Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities, and Policy (DOTMLPF-P) analytic basis for cost and capability trades driving non-materiel and/or materiel solutions. Early-phase systems engineering and technical planning activities funded by this program provide the foundation for informed investment decisions leading to successful acquisition programs. Development planning efforts arise from engagements with industry and academia, from intersections of technology improvements with Air Force missions, from emerging operational requirements, and from vetted future-fight concepts.

This program element may include necessary and emergent civilian pay expenses required to manage, execute, and deliver Requirements Analysis and Maturation capability for both Projects. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0604858F.

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver Integrated Simulation and Analysis for emergent or unanticipated weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

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B. Program Change Summary (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	90.799	101.844	106.577	0.000	106.577
Current President's Budget	88.259	109.513	89.956	0.000	89.956
Total Adjustments	-2.540	7.669	-16.621	0.000	-16.621
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	8.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-2.540	0.000			
• Other Adjustments	0.000	-0.331	-16.621	0.000	-16.621

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: 666157: *Development Planning*

Congressional Add: *Program increase - nuclear modernization analytics*

Congressional Add Subtotals for Project: 666157

Project: 666158: *INTEGRATED SIMULATION AND ANALYSIS*

Congressional Add: *Digital Modernization*

Congressional Add Subtotals for Project: 666158

Congressional Add Totals for all Projects

	FY 2022	FY 2023
	9.720	0.000
	9.720	0.000
	0.000	8.000
	0.000	8.000
	9.720	8.000

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Appropriation/Budget Activity 3600 / 6	R-1 Program Element (Number/Name) PE 0606017F / <i>Requirements Analysis and Maturation</i>	Project (Number/Name) 666157 / <i>Development Planning</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>666157: Development Planning</i>	-	22.177	13.446	14.065	0.000	14.065	14.271	14.582	14.839	15.092	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Development Planning (DP) project funds activities that analyze Air Force capability needs and requirements to identify potential shortfalls and opportunities; formulate candidate concepts and solution options addressing identified capability needs and shortfalls; obtain specific evidence to confirm and refute capability bounds; and conduct coordinated early systems engineering to derive key capability trades, technology needs, and cost and schedule implications. Emphasis is placed on activities informing strategic planning and operational experimentation, analyzing multi-domain capabilities that look first at non-materiel solutions before generating materiel needs and requirements.

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

	FY 2022	FY 2023	FY 2024
Title: Future Capability Analyses	5.137	6.262	6.279
Description: Conduct capability analyses that decompose long-term warfighter capability goals and requirements into pertinent materiel and non-materiel elements. Identify opportunities and potential shortfalls between planned investments and long-term capability needs. Engage technology base and test communities to inform capability employment and constraints. Reduce analytical uncertainties through focused investments yielding specific capability information.			
FY 2023 Plans: Continue to assess capabilities derived from future Air Force constructs, collaborating within and across Service analysis organizations as subject-matter expertise requires. Develop operational mission concepts paired with analytically supported capability concepts, with increased emphasis on support systems and logistics.			
FY 2024 Plans: Continue to assess capabilities derived from future Air Force constructs, collaborating within and across Service analysis organizations as subject-matter expertise requires. Conduct capabilities-based assessments scoped in a manner consistent with Department of the Air Force operational imperatives. Document mission impact statements and their corresponding materiel and non-materiel gaps. Derive capability gaps from operational mission definitions and estimates of current-inventory performance and technical state of the art. Engage Federally Funded Research and Development Centers and policy research institutes on appropriate operational imperatives. Develop mission impact and gap findings into initial capability visions and early capability concepts consistent with relevant time horizons.			
FY 2023 to FY 2024 Increase/Decrease Statement:			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2022	FY 2023	FY 2024
FY 2024 funding increased compared to FY 2023 by \$0.017 million. Funding increased due to a slightly larger number of expected operational imperative capabilities requiring early investigatory analysis.				
<p>Title: Concept Development</p> <p>Description: Develop operationally consistent and technologically informed capability concepts delivering military utility and informing strategic investment decisions. Validate materiel and non-materiel capability elements through rigorous problem decomposition, engagement with warfighters and with industry, and access to operationally relevant evidence to include suitability considerations. Discern critical dependencies among capability concept elements, including operational mission assets and technology investments. Distinguish developmental capability concept elements from materiel and non-materiel elements currently available. Develop capability tailored measures of performance and measures of effectiveness, which may include necessary digital tools. Identify key drivers for technical risk, cost risk, and schedule risk. Verify suitability of analysis baseline for capabilities being investigated, communicating limitations to stakeholders and proposing mitigation strategies as appropriate. Revisit previously developed capability concepts as needed, update concept elements and operational employment to reflect emerging mission needs and maturing technology alternatives.</p> <p>FY 2023 Plans: Continue to develop advanced capability concepts with project-appropriate partners and stakeholders, including Air Force Futures, Air Force Lifecycle Management Center (AFLCMC), Air Force Materiel Command (AFMC), Air Combat Command (ACC), Air Mobility Command (AMC), Air Force Global Strike Command (AFGSC), Pacific Air Forces (PACAF), U.S. Air Forces in Europe (USAFE), and Air Forces Northern (AFNORTH). Increase focus on efforts related to non-weapon systems and support requirements, including those associated with information aggregation and decision support.</p> <p>FY 2024 Plans: Continue to develop advanced capability concepts with appropriate partners and stakeholders. Conduct market research and engage industry elements with historical experience consistent with Air Force operational imperatives. Develop early capability concepts into industry-informed, operationally impactful, technically viable concept characterizations that inform investment priorities and acquisition decisions.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: FY 2024 funding increased compared to FY 2023 by \$0.637 million. Funding increased due to a modest increase in the number of operational imperative capability visions warranting maturation into developed concepts.</p>		4.780	4.639	5.276
<p>Title: Capability Development Strategies</p> <p>Description: Conduct strategic planning activities that translate capability concepts into candidate courses of action suitable for informing future acquisition and future research and development. Identify critical decisions, milestones, and operational</p>		2.540	2.545	2.510

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024
<p>employment factors influencing capability courses of action. Identify technology alternatives, potential materiel/non-materiel mixes, and order-of-magnitude cost estimates within candidate courses of action. Develop recommendations for materiel and non-materiel investments providing key capability enablers. Develop capability risk mitigation approaches and conduct focused risk reduction. Refine capability cost and schedule drivers as additional information is obtained. Estimate system-of-system, system, sub-system, component, and/or contributing technology performance needed to achieve warfighter-driven thresholds on capability performance and effectiveness. Develop recommendations for time-phased and performance-gated capability delivery, including incremental system and sub-system capabilities where appropriate.</p> <p>FY 2023 Plans: Continue to perform pre-systems acquisition planning activities including refinement of concepts into risk-informed preliminary designs and development of recommendations for science and technology investments.</p> <p>FY 2024 Plans: Continue to perform pre-systems acquisition planning activities including refinement of concepts into risk-informed, industry-informed preliminary designs and including development of recommendations for science and technology investments.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: FY 2024 funding decreased compared to FY 2023 by \$0.035 million. Funding decreased due to a slight reduction in the number of expected capability concepts ready for acquisition-path development.</p>			
Accomplishments/Planned Programs Subtotals	12.457	13.446	14.065

	FY 2022	FY 2023
Congressional Add: Program increase - nuclear modernization analytics	9.720	0.000
FY 2022 Accomplishments: Conduct Congressionally - Directed Efforts		
FY 2023 Plans: N/A		
Congressional Adds Subtotals	9.720	0.000

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

Remarks

D. Acquisition Strategy
Not Applicable

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Appropriation/Budget Activity 3600 / 6					R-1 Program Element (Number/Name) PE 0606017F / <i>Requirements Analysis and Maturation</i>				Project (Number/Name) 666158 / <i>INTEGRATED SIMULATION AND ANALYSIS</i>			
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
666158: <i>INTEGRATED SIMULATION AND ANALYSIS</i>	-	66.082	96.067	75.891	0.000	75.891	39.703	29.876	30.480	31.576	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Integrated Simulation and Analysis project provides a collaborative cross-organizational, multi-domain, holistic enterprise system-of-systems perspective in synthetic environments for modeling, simulation, analysis, and experimentation of systems, systems-of-systems, and concepts under assessment while enabling exploration of innovative materiel and non-materiel alternatives. This effort produces system performance representations/models, environments, architectures, data, and tools that underpin variable fidelity, stand-alone, interactive, and distributed simulations; and virtual prototyping using an adaptive ecosystem comprised of organizations and capabilities aligned with purpose and linkages to Model Based Systems Engineering/Digital Engineering processes. Integrated Simulation and Analysis combines real-time and constructive simulations, operators-in-the-loop, Modeling and Simulation powered war-gaming, experimental and operational software and hardware engineered in synthesized environments to conduct rapid air, space, cyber, and multi-domain warfighting capabilities assessments in support of development planning, experimentation, developmental and operational testing, and training requirements. This ecosystem is a component of a larger Department of the Air Force level Modeling and Simulation infrastructure, and serves as a template to identify, roadmap, and support the broader Modeling and Simulation infrastructure supporting the Modeling and Simulation centric portions of the acquisition lifecycle and operational warfighters.

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

	FY 2022	FY 2023	FY 2024
Title: Modeling, Simulation, Analysis, and Experimentation Ecosystem	15.449	16.689	19.168
Description: Develop enterprise capable, cross-domain system-of-systems modeling, simulation, and analysis capabilities to support development planning, capabilities assessment, and acquisition decisions.			
FY 2023 Plans: Continue to evolve and implement the design template for the broader Department of the Air Force level capability development Modeling and Simulation enterprise ecosystem. Integration of United States Space Force Modeling and Simulation capabilities into the ecosystem supporting both system and broad system-of-system, multi-domain level capability development concepts, pre-systems planning, and other relevant strategic development planning activities. Continue to evolve a modeling, simulation and analysis infrastructure containing extensive software models and software tools consistent with Air Force and Joint enterprise needs, including digital engineering and model-based systems engineering. Continue to enable Modeling and Simulation powered wargaming, support secure data management and sharing, maintain a skilled cadre of analysts, and develop advanced analytical methods required for tailored fidelity of battlespace environments. Continue to make available and enhance composable models and common frameworks that can be used to support robust development planning and experimentation for Air Force leadership. This activity will be leveraged to scale up for the broader Department of the Air Force level Modeling and Simulation enterprise			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2022	FY 2023	FY 2024
and identify Modeling and Simulation synergies between analytic, experimentation, test, training, and planning activities in support of enterprise infrastructure.				
<p>FY 2024 Plans: Continue to evolve and implement the design template for the broader Department of the Air Force level capability development Modeling and Simulation enterprise ecosystem. Continued integration of United States Space Force Modeling and Simulation capabilities into the ecosystem supporting both system and broad system-of-system, multi-domain level capability development concepts, pre-systems planning, and other relevant strategic development planning activities. Evolve and integrate a modeling, simulation and analysis infrastructure containing extensive software models and software tools consistent with Air Force and Joint enterprise needs, including digital engineering and model-based systems engineering. Continue to enhance tools and enable Modeling and Simulation powered wargaming, support secure data management and sharing, maintain a skilled cadre of analysts, and develop advanced analytical methods required for tailored fidelity of battlespace environments. Continue to make available and enhance composable models and common frameworks that can be used to support robust development planning and experimentation for Air Force leadership. This activity will be leveraged to scale up for the broader Department of the Air Force level Modeling and Simulation enterprise and identify Modeling and Simulation synergies for reusability, commonality, and interoperability between analytic, experimentation, test, training, and planning activities in support of enterprise infrastructure.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: FY2024 funding increased compared to FY2023 by \$2.479 million due to increase in scope of ecosystem, increasing capacity and capability, and integration costs in support of Department of the Air Force Modeling and Simulation Ecosystem and tools.</p>				
<p>Title: Common Synthetic Training Environment (CSTE)</p> <p>Description: Develop a Government-owned synthetic training capability suitable for distributed training scenarios in a single shared environment across multiple warfighting and security domains. This effort is required to address capability gaps highlighted in the Joint Tactical Air Analysis of Alternatives study, to include systemic deficiencies for both live and synthetic training and an expanding gap between warfighter needs and training infrastructure capabilities.</p> <p>FY 2023 Plans: Continue programmatic efforts for the Common Synthetic Training Environment project; Common Synthetic Training Environment development; attribute definition, interface development, and prototype/pathfinder efforts to lay the foundation of the Common Synthetic Training Environment; begin minimal targeted development and integration of environment products to include Multiple Level Security (MLS) network elements.</p> <p>FY 2024 Plans: Requirement for a synthetic training environment will be met by the Joint Simulation Environment effort. Funding in FY22, FY23 and FY24 will be used to further the development of JSE test and training capabilities to Initial Operational Capability, enabling</p>		23.859	55.168	0.000

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2022	FY 2023	FY 2024
<p>future training applications. Activities include continued JSE development of synthetic test and training capabilities, as well as the application of new technologies (Multi-Level Security, distributed operations, etc.) and capabilities to the JSE architecture. Costs include hardware, software, facilities, and personnel needed to develop JSE.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: The FY2024 funding decreased by \$55.168 million. Funding decreased due to \$39.374M being realigned from CSTE to JSE. Additionally, funds were reduced by \$15.8M.</p>				
<p>Title: Joint Simulation Environment (JSE)</p> <p>Description: Develops a government-owned and operated modeling and simulation capability that enables multi-platform, multi-domain integration and interoperability. This capability is required to support developmental and operational testing, tactics development, and advanced training for 5th-generation platforms and other future capabilities that are critical for force development.</p> <p>FY 2023 Plans: Continue to support Virtual Air Threats (VATs) and Multi Mission Test Platform (MMTPs) which are designed to be enable test and experimentation with JSE. Continue developing, testing, documenting and delivering aircraft threat models using the Threat Modeling and Analysis Program (TMAP).</p> <p>FY 2024 Plans: Continue activities to develop JSE capabilities enabling further test, integration and training. Efforts include continued Virtual Air Threats (VATs) development and Multi Mission Test Platform (MMTPs) refinement. Continue developing, testing, documenting and delivering aircraft threat models using the Threat Modeling and Analysis Program (TMAP), and continued platform/capability integration within JSE. Costs include (but are not limited to) establishing equipment, personnel, processes, contracts, etc. to support JSE product development for the Air Force.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: FY2024 funding increased compared to FY2023 by \$39.374 million. Funding increased due to CSTE funds being realigned to JSE.</p>		23.372	12.858	52.232
<p>Title: Simulation and Analysis Facility Support</p> <p>Description: Develops high-fidelity, live-virtual-constructive modeling, simulation, and analysis capability to evaluate warfighting capabilities, strategies, concepts of operation, tactics, emerging technologies, and human system interfaces to support and enable acquisition, test, and training.</p> <p>FY 2023 Plans:</p>		3.402	3.352	4.491

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024
<p>Continue to perform pre-systems acquisition planning activities. Continue to develop capability concepts into high-level initial designs supporting dependency analysis, performance estimation, risk identification, and additional concept refinement in coordination with Air Force leadership. Develop prioritized recommendations for science and technology investments in the critical path of key capability enablers. These funds may cover hardware, software, personnel and other costs needed to accomplish the mission to include agile software programming capabilities.</p> <p>FY 2024 Plans: Continue to perform pre-systems acquisition planning activities. Continue to develop capability concepts into high-level initial designs supporting dependency analysis, performance estimation, risk identification, and additional concept refinement in coordination with Air Force leadership. Develop prioritized recommendations for science and technology investments in the critical path of key capability enablers. Expand agile software programming capabilities. These funds may cover hardware, software, personnel and other costs needed to accomplish the mission.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: FY2024 funding increased compared to FY2023 by \$1.139 million. Funding increased due to increased scope and costs.</p>			
Accomplishments/Planned Programs Subtotals	66.082	88.067	75.891

	FY 2022	FY 2023
Congressional Add: Digital Modernization	0.000	8.000
FY 2022 Accomplishments: N/A		
FY 2023 Plans: Conduct Congressionally Directed Activities		
Congressional Adds Subtotals	0.000	8.000

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

N/A

Remarks

D. Acquisition Strategy

Not Applicable