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

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 6: RDT&amp;E Management Support</i>	<b>R-1 Program Element (Number/Name)</b> PE 0606017F / <i>Requirements Analysis and Maturation</i>
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COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
Total Program Element	-	66.233	90.799	101.844	0.000	101.844	106.577	53.509	43.929	44.905	Continuing	Continuing
666157: <i>Development Planning</i>	-	19.113	22.804	13.446	0.000	13.446	13.744	14.004	14.300	14.618	Continuing	Continuing
666158: <i>INTEGRATED SIMULATION AND ANALYSIS</i>	-	47.120	67.995	88.398	0.000	88.398	92.833	39.505	29.629	30.287	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) and 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.

The FY 2023 funding request was reduced by \$22.516 million to account for the availability of prior year execution balances.

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>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
Previous President's Budget	68.256	85.799	0.000	0.000	0.000
Current President's Budget	66.233	90.799	101.844	0.000	101.844
Total Adjustments	-2.023	5.000	101.844	0.000	101.844
• Congressional General Reductions	0.000	-5.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	10.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-2.023	0.000			
• Other Adjustments	0.000	0.000	101.844	0.000	101.844

**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

Congressional Add Totals for all Projects

	<b>FY 2021</b>	<b>FY 2022</b>
	4.853	10.000
Congressional Add Subtotals for Project: 666157	4.853	10.000
Congressional Add Totals for all Projects	4.853	10.000

**Change Summary Explanation**

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

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

<b>Appropriation/Budget Activity</b> 3600 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0606017F / <i>Requirements Analysis and Maturation</i>	<b>Project (Number/Name)</b> 666157 / <i>Development Planning</i>
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COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
666157: <i>Development Planning</i>	-	19.113	22.804	13.446	0.000	13.446	13.744	14.004	14.300	14.618	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 2021	FY 2022	FY 2023
<p><b>Title:</b> Future Capability Analyses</p> <p><b>Description:</b> 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.</p> <p><b>FY 2022 Plans:</b> Continue to assess capabilities derived from future Air Force constructs, collaborating within and across Service analysis organizations as subject-matter expertise requires. Develop analytically informed warfighter capability regimes and derive tailored technology contributions. Aggregate capability elements into coarsely defined capability concepts and concepts of employment consistent with projections of Air Force missions and force mixes.</p> <p><b>FY 2023 Plans:</b> 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.</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> FY 2023 funding increased compared to FY 2022 by \$1.118 million due to greater emphasis on early concept analysis paired with maturing operational concepts.</p>	4.590	5.144	6.262
<p><b>Title:</b> Concept Development</p>	4.469	4.780	4.639

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 3600 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0606017F / <i>Requirements Analysis and Maturation</i>	<b>Project (Number/Name)</b> 666157 / <i>Development Planning</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
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**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. 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. 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.

**FY 2022 Plans:**  
Continue to develop advanced concepts informing solutions to emerging near-term and anticipated long-term warfighter capability needs. Partner within and across Services as required to inform and hone capability desires. Augment ongoing modeling, development, and/or test activities to acquire key evidence, validate key assumptions, and validate and refine models.

**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.

**FY 2022 to FY 2023 Increase/Decrease Statement:**  
FY 2023 funding decreased compared to FY 2022 by \$0.141 million due to maturing operational concepts.

<b>Title:</b> Capability Development Strategies	5.201	2.880	2.545
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**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 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

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
capability performance and effectiveness. Develop recommendations for time-phased and performance-gated capability delivery, including incremental system and sub-system capabilities where appropriate.			
<b><i>FY 2022 Plans:</i></b> 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. Develop prioritized recommendations for science and technology investments in the critical path of key capability enablers.			
<b><i>FY 2023 Plans:</i></b> 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.			
<b><i>FY 2022 to FY 2023 Increase/Decrease Statement:</i></b> FY 2023 funding decreased compared to FY 2022 by \$0.335 million due to maturing operational concepts.			
<b>Accomplishments/Planned Programs Subtotals</b>	14.260	12.804	13.446

	<b>FY 2021</b>	<b>FY 2022</b>
<b><i>Congressional Add:</i></b> Program increase - nuclear modernization analytics	4.853	10.000
<b><i>FY 2021 Accomplishments:</i></b> Conduct Congressionally - Directed Efforts		
<b><i>FY 2022 Plans:</i></b> Conduct Congressionally - Directed Efforts		
<b>Congressional Adds Subtotals</b>	4.853	10.000

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

N/A

**Remarks**

**D. Acquisition Strategy**

Not Applicable

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force										<b>Date:</b> April 2022		
<b>Appropriation/Budget Activity</b> 3600 / 6					<b>R-1 Program Element (Number/Name)</b> PE 0606017F / <i>Requirements Analysis and Maturation</i>				<b>Project (Number/Name)</b> 666158 / <i>INTEGRATED SIMULATION AND ANALYSIS</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
666158: <i>INTEGRATED SIMULATION AND ANALYSIS</i>	-	47.120	67.995	88.398	0.000	88.398	92.833	39.505	29.629	30.287	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)**

	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
<b>Title:</b> Modeling, Simulation, Analysis, and Experimentation Ecosystem	16.995	15.905	15.018
<b>Description:</b> Develop enterprise capable, cross-domain system-of-systems modeling, simulation, and analysis capabilities to support development planning, capabilities assessment, and acquisition decisions.			
<b>FY 2022 Plans:</b> 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.			
<b>FY 2023 Plans:</b> 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,			

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
<p>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 and identify Modeling and Simulation synergies between analytic, experimentation, test, training, and planning activities in support of enterprise infrastructure.</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> FY 2023 funding decreased compared to FY 2022 by \$0.887 million. Funding decreased because of prior year execution balances.</p>				
<p><b>Title:</b> Common Synthetic Training Environment (CSTE)</p> <p><b>Description:</b> 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><b>FY 2022 Plans:</b> Initiate activities in FY 2022 include commencement of programmatic efforts for the overall Common Synthetic Training Environment sub-project; a Common Synthetic Training Environment consortium of relevant vendors; prototype/pathfinder efforts that lay the foundation for Multi-Level Security networks, solve latency issues, and build an enduring high fidelity environment; awarding contracts for the environment and Multi-Level Security network development.</p> <p><b>FY 2023 Plans:</b> 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><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b></p>		0.000	24.609	62.350

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
FY 2023 funding increased compared to FY 2022 by \$37.741 million. Funding increased due to the addition of major activities such as but not limited to minimal development of the Multi-Level Security network, the government owned environment				
<p><b>Title:</b> Joint Simulation Environment (JSE)</p> <p><b>Description:</b> 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><b>FY 2022 Plans:</b> Continue prototyping and integration of critical JSE components into a robust software environment for test, advanced training, and experimentation. Continue to integrate additional modeling capabilities for electronic warfare, weapons, and space effects into the baseline.</p> <p><b>FY 2023 Plans:</b> 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><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> FY 2023 funding decreased compared to FY 2022 by \$16.473 million. Funding decreased due to maturation of the Joint Simulation Environment and to account for prior year execution balances.</p>		26.828	24.003	7.530
<p><b>Title:</b> Simulation and Analysis Facility Support</p> <p><b>Description:</b> Develops real-time, high-fidelity, live-virtual-constructive modeling, simulation, and analysis capability to evaluate network-enabled warfighting capabilities, strategies, concepts of operation, tactics, emerging technologies, and human system interfaces to support and enable acquisition, test, and training.</p> <p><b>FY 2022 Plans:</b> Continue to upgrade and develop integrated processes, tools, simulation environments, and capabilities to support live-virtual-constructive modeling, simulation, and analysis focusing on cross-domain and multi-level security infrastructures supporting analysis, assessment, experimentation, and operational test and training infrastructures.</p> <p><b>FY 2023 Plans:</b> 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</p>		3.297	3.478	3.500

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
coordination with Air Force leadership. Develop prioritized recommendations for science and technology investments in the critical path of key capability enablers.  <b><i>FY 2022 to FY 2023 Increase/Decrease Statement:</i></b> FY 2023 funding increased compared to FY 2022 by \$0.022 million due to increased need for prioritized recommendations for science and technology investments.				
<b>Accomplishments/Planned Programs Subtotals</b>		47.120	67.995	88.398
<b>C. Other Program Funding Summary (\$ in Millions)</b>				
N/A				
<b>Remarks</b>				
<b>D. Acquisition Strategy</b>				
Not Applicable				