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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2025 Air Force **Date:** March 2024

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 3: Advanced Technology Development (ATD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603601F / <i>Conventional Weapons Technology</i>
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COST (\$ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
Total Program Element	-	144.026	132.311	125.460	0.000	125.460	99.728	115.143	121.100	120.674	Continuing	Continuing
63670A: <i>Weapon Technology Development</i>	-	52.693	68.027	73.669	0.000	73.669	55.738	72.897	80.575	79.302	Continuing	Continuing
63670B: <i>Weapon Concept Development</i>	-	91.333	64.284	51.791	0.000	51.791	43.990	42.246	40.525	41.372	Continuing	Continuing

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

This program develops, integrates, and demonstrates advanced ordnance and guidance technologies for conventional weapons. The effort focuses on conventional ordnance component technologies such as warheads, fuzes, and explosives, as well as munition guidance component technologies such as navigation and control systems and seekers. Technologies to be developed, demonstrated, and integrated into system concepts will address blast, fragmentation, penetration, low collateral damage, variable depth/location fuzing, precise guidance, and high-performance and insensitive explosives. Efforts in this project have been coordinated through the Department of Defense Science and Technology Executive Committee process to harmonize efforts and eliminate duplication.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver science & technology capabilities. The use of such program funds in this PE would be in addition to the civilian pay expenses budgeted in program elements 0601102F, 0602102F, 0602201F, 0602202F, 0602203F, 0602204F, 0602605F, 0602788F, 0602298F, and 0602020F.

This program element may include necessary expenses to support the operation and maintenance of facilities to manage, execute, and deliver science and technology capabilities.

This program is in Budget Activity 3, Advanced Technology Development because this budget activity includes development of subsystems and components and efforts to integrate subsystems and components into system prototypes for field experiments and/or tests in a simulated environment.

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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025 Base</b>	<b>FY 2025 OCO</b>	<b>FY 2025 Total</b>
Previous President's Budget	154.618	132.311	136.709	0.000	136.709
Current President's Budget	144.026	132.311	125.460	0.000	125.460
Total Adjustments	-10.592	0.000	-11.249	0.000	-11.249
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-4.867	0.000			
• Other Adjustments	-5.725	0.000	-11.249	0.000	-11.249

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

**Project:** 63670B: *Weapon Concept Development*

Congressional Add: *Next generation affordable direct attack munition*

Congressional Add Subtotals for Project: 63670B

Congressional Add Totals for all Projects

	<b>FY 2023</b>	<b>FY 2024</b>
	9.685	-
	9.685	-
	9.685	-

**Change Summary Explanation**

FY 2025 funding request was reduced by \$5.211 million to account for the availability of prior year execution balances.

FY 2025 funding request was reduced by \$6.290 million due to Air Force funding re-prioritization.

FY 2025 funding request was increased \$0.252 million due to inflation rates for Non-pay and non-fuel purchases

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2025 Air Force										<b>Date:</b> March 2024		
<b>Appropriation/Budget Activity</b> 3600 / 3					<b>R-1 Program Element (Number/Name)</b> PE 0603601F / <i>Conventional Weapons Technology</i>				<b>Project (Number/Name)</b> 63670A / <i>Weapon Technology Development</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025 Base</b>	<b>FY 2025 OCO</b>	<b>FY 2025 Total</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>FY 2029</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
63670A: <i>Weapon Technology Development</i>	-	52.693	68.027	73.669	0.000	73.669	55.738	72.897	80.575	79.302	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This project develops, matures, assesses, and demonstrates advanced/innovative ordnance and guidance component and subsystem technologies for conventional weapons. The project focuses on maturation of advanced explosives, fuzes, warheads, sub-munitions, and weapon airframes, carriage and dispensing; as well as innovative munition seekers, weapon aerodynamics, navigation and control, and guidance subsystem integration/simulation.

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

	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<b>Title:</b> Ordnance Technologies	25.816	32.626	35.332
<b>Description:</b> Develop and demonstrate integrated ordnance technologies to improve conventional munitions. Specific technical areas of focus include energetic materials, fuze technology, warhead sciences, and modeling and simulation tools.			
<b>FY 2024 Plans:</b> Continue demonstrating and assessing advanced distributed, embedded fuzing concepts for long-term safety, survivability, and functionality. Continue advanced development of ordnance technologies to allow tailored lethality by controlling weapon fragmentation. Continue maturation of advanced ordnance technologies for rapid transition into high-speed strike weapon concepts, collecting complex arena test data for implementation into lethality modeling and simulation tools. Continue developing test capabilities and high-fidelity analysis tools to quickly generate more accurate weaponing data. Continue developing advanced ordnance technologies for high-speed impact. Continue developing advanced ordnance technologies/methodologies for functional defeat. Continue research into armament systems for Special Operations applications. Continue conducting lethality analyses for weapons and lethality/survivability tools at the meso/micro-scale. Continue the development of high-fidelity test capabilities and analysis tools to evaluate ordnance technologies in relevant environments. Continue incorporation of previously developed material models and improve/advance additional joint kinetic/directed energy common target models. Continue synthesis and incorporation of warhead models for progressive collapse, multiple point initiation, secondary debris and other models to include those supportive of coordinated and distributed impact.			
<b>FY 2025 Plans:</b> - Continue demonstrating and assessing advanced distributed, embedded fuzing concepts for long-term safety, survivability, and functionality. - Continue advanced development of ordnance technologies to allow tailored lethality by controlling weapon fragmentation.			

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<b>Appropriation/Budget Activity</b> 3600 / 3	<b>R-1 Program Element (Number/Name)</b> PE 0603601F / <i>Conventional Weapons Technology</i>	<b>Project (Number/Name)</b> 63670A / <i>Weapon Technology Development</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<ul style="list-style-type: none"> <li>- Continue maturation of advanced ordnance technologies for rapid transition into high-speed strike weapon concepts, collecting complex arena test data for implementation into lethality modeling and simulation tools.</li> <li>- Continue developing test capabilities and high-fidelity analysis tools to quickly generate more accurate weaponeering data.</li> <li>- Continue developing advanced ordnance technologies for high-speed impact.</li> <li>- Continue developing advanced ordnance technologies/methodologies for functional defeat.</li> <li>- Complete research into armament systems for Special Operations applications.</li> <li>- Continue conducting lethality analyses for weapons and lethality/survivability tools at the meso/micro-scale.</li> <li>- Continue the development of high-fidelity test capabilities and analysis tools to evaluate ordnance technologies in relevant environments.</li> <li>- Continue incorporation of previously developed material models and improve/advance additional joint kinetic/directed energy common target models.</li> <li>- Continue synthesis and incorporation of warhead models for progressive collapse, multiple point initiation, secondary debris, and other models to include those supportive of coordinated and distributed impact.</li> </ul> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> FY 2025 increased compared to FY 2024 by \$2.706 million due to increased emphasis on advanced technology development in high-speed ordnance technology and ordnance technologies versus maritime targets.</p>			
<p><b>Title:</b> Guidance Technologies</p> <p><b>Description:</b> Develop guidance technologies to improve the precision, controlled lethality, and flexibility of conventional munitions. Specific technical areas include precision navigation and terminal seekers.</p> <p><b>FY 2024 Plans:</b> Continue integration of hardware-in-the-loop, software-in-the-loop, and other modeling and simulation technologies for the demonstration of open architecture, high-speed, networked, collaborative and autonomous, and modular munition concepts. Complete the design, development, and evaluation of seeker sub-system prototypes for platform self-defense and initiate investigation of alternative applications. Continue development of advanced, high-resolution infrared scene projectors, distributed simulation concepts, software-defined radio frequency test chamber, scene generation, mission, engagement, campaign level simulations, and panoramic infrared dome technologies. Continue to develop technologies for precision navigation of weapons in Global Positioning System-denied scenarios. Continue to mature and integrate advanced carriage and release concepts and sub-systems. Continue improving multi-security level, cross-domain distributed modeling and simulation for munition research using distributed connectivity between Eglin Air Force Base facilities and other geographic locations. Continue integrating higher-fidelity lethality models into guidance and control simulations to enhance weapon integrated performance. Continue integrating higher fidelity constructive analysis tools with engagement and mission level modeling and simulation. Complete miniature munition</p>	26.877	35.401	38.337

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<p>technology integration for ground launch demonstration. Continue design and development of a weapons digital ecosystem that enables digital engineering and the use of high-fidelity digital twinning across the weapons lifecycle.</p> <p><b>FY 2025 Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue integration of hardware-in-the-loop, software-in-the-loop, and other modeling and simulation technologies for the demonstration of open architecture, high-speed, networked, collaborative and autonomous, and modular munition concepts.</li> <li>- Complete investigation of alternative applications for seeker sub-system prototypes originally developed for platform self-protection.</li> <li>- Continue development of advanced, high-resolution infrared scene projectors, distributed simulation concepts, software-defined radio frequency test chamber, scene generation, mission, engagement, campaign level simulations, and panoramic infrared dome technologies.</li> <li>- Continue to develop technologies for precision navigation of weapons in Global Positioning System-denied scenarios.</li> <li>- Continue to mature and integrate advanced carriage and release concepts and sub-systems.</li> <li>- Continue improving multi-security level, cross-domain distributed modeling and simulation for munition research using distributed connectivity between Eglin Air Force Base facilities and other geographic locations.</li> <li>- Continue integrating higher-fidelity lethality models into guidance and control simulations to enhance weapon integrated performance.</li> <li>- Continue integrating higher fidelity constructive analysis tools with engagement and mission level modeling and simulation.</li> <li>- Continue design and development of a weapons digital ecosystem that enables digital engineering and the use of high-fidelity digital twinning across the weapons lifecycle.</li> </ul> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> FY 2025 increased compared to FY 2024 by \$2.936 million due to the acceleration of digital demonstrations of open architecture, high-speed, networked, collaborative and autonomous (NCA), and modular munition concepts within a weapons digital ecosystem.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	52.693	68.027	73.669

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

N/A

**Remarks**

**D. Acquisition Strategy**

Not applicable.

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<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025 Base</b>	<b>FY 2025 OCO</b>	<b>FY 2025 Total</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>FY 2029</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
63670B: <i>Weapon Concept Development</i>	-	91.333	64.284	51.791	0.000	51.791	43.990	42.246	40.525	41.372	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This project develops, refines, integrates, demonstrates, and assesses ordnance and guidance technologies to reduce risk for potential conventional weapons acquisitions. The project concentrates in two effort areas, Air-to-Air Concept Development and Air-to-Ground Concept Development. The project focuses on risk reduction of advanced explosives, fuzes, warheads, sub-munitions, and weapon airframes, carriage and dispensing; as well as innovative munition seekers, weapon aerodynamics, navigation and control, and guidance subsystem integration/simulation.

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

	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<b>Title:</b> Air-to-Air Concept Development	39.519	30.585	24.641
<b>Description:</b> Mature, integrate, and demonstrate air-to-air weapon components and systems to include ordnance, guidance, and carriage and release technologies to demonstrate war-fighter capability.			
<b>FY 2024 Plans:</b> Continue developing the technology trade space to enable air-to-air weapons with robust capability in the future threat environment, including technologies for efficient propulsion, high lethality, efficient flight, high agility, miniaturization, as well as cost and risk reduction for both offensive and defensive purposes. Continue developing and testing propulsion systems with flexibility to enable more adaptable next generation air-to-air weapons. Continue conducting lethality analysis to enable design of small form factor warheads for lethality against the 2030-plus target set. Continue transitioning advanced target models to other AF and DoD offices. Continue developing preliminary design of air-to-air weapon concepts for sixth-generation platforms. Continue exploring and documenting missile flight dynamics trade space. Continue conducting wind-tunnel experiments to characterize airframes and validate aerodynamic codes leading to development of highly maneuverable and efficient missiles to counter advanced targets, and improve persistence and survivability of future platforms. Continue conducting ground and arena tests of advanced weapons experimental carriages for sixth-generation weapon concept and prepare for flight worthiness testing. Continue performing experiments with small warheads to obtain data for lethality analysis to validate and improve designs. Continue planning and executing integrated sub-system experiments. Continue modeling, simulation, analysis, and digital engineering in support of air-to-air advanced weapon technologies.			
<b>FY 2025 Plans:</b>			

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<ul style="list-style-type: none"> <li>- Continue developing the technology trade space to enable air-to-air weapons with robust capability in the future threat environment, including technologies for efficient propulsion, long-range, high lethality, efficient flight, high agility, miniaturization, as well as cost and risk reduction for both offensive and defensive purposes.</li> <li>- Continue developing and testing propulsion systems with flexibility to enable more adaptable next generation air-to-air weapons.</li> <li>- Continue conducting lethality analysis to enable design of small form factor warheads for lethality against the 2030-plus target set.</li> <li>- Continue transitioning advanced target models to other AF and DoD offices.</li> <li>- Continue developing preliminary design of air-to-air weapon concepts for sixth- generation platforms.</li> <li>- Continue exploring and documenting missile flight dynamics trade space.</li> <li>- Continue conducting wind-tunnel experiments to characterize airframes and validate aerodynamic codes leading to development of highly maneuverable and efficient missiles to counter advanced targets and improve persistence and survivability of future platforms.</li> <li>- Continue conducting ground and arena tests of advanced weapons experimental carriages for sixth-generation weapon concept and prepare for flight worthiness testing.</li> <li>- Continue performing experiments with small warheads to obtain data for lethality analysis to validate and improve designs.</li> <li>- Continue planning and executing integrated sub-system experiments.</li> <li>- Continue modeling, simulation, analysis, and digital engineering in support of air-to-air advanced weapon technologies.</li> </ul> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> FY 2025 decreased compared to FY 2024 by \$5.944 million due to reduced scope of efforts associated with system-level integration and concept demonstration of technical components/subsystems in deference to higher Air Force priorities.</p>			
<p><b>Title:</b> Air-to-Ground Concept Development</p> <p><b>Description:</b> Mature, integrate, and demonstrate air-to-ground weapon components and systems (ordnance, guidance, and carriage and release technologies) to demonstrate war-fighter capability.</p> <p><b>FY 2024 Plans:</b> Continue technology risk reduction including demonstration and flight testing for weapons concepts responsive to the future threat environment (including hypersonic and high-speed concepts). Initiate technology risk reduction for hypersonic and high-speed weapon concepts development within a scalable, cloud-enabled modeling and simulation ecosystem. Continue developing kinetic/ non-kinetic payloads, seeker, and fuze technology for hypersonic applications. Continue modeling, simulation, analysis, and digital engineering in support of air-to-ground advanced weapon technologies.</p> <p><b>FY 2025 Plans:</b></p>	42.129	33.699	27.150

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>
<ul style="list-style-type: none"> <li>- Continue technology risk reduction including demonstration and flight testing for weapons concepts responsive to the future threat environment (including hypersonic and high-speed concepts).</li> <li>- Continue technology risk reduction for hypersonic and high-speed weapon concepts development within a scalable, cloud-enabled modeling and simulation ecosystem.</li> <li>- Continue developing kinetic payloads, seeker, and fuze technology for hypersonic and high-speed applications.</li> <li>- Continue modeling, simulation, analysis, and digital engineering in support of air-to-ground advanced weapon technologies.</li> </ul> <p><b><i>FY 2024 to FY 2025 Increase/Decrease Statement:</i></b>  FY 2025 decreased compared to FY 2024 by \$6.549 million due to reduced scope of efforts associated with system-level integration and concept demonstration of technical components/subsystems in deference to higher Air Force priorities.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	81.648	64.284	51.791

	<b>FY 2023</b>	<b>FY 2024</b>
<b><i>Congressional Add:</i></b> Next generation affordable direct attack munition	9.685	-
<b><i>FY 2023 Accomplishments:</i></b> Conduct Congressionally-directed efforts.		
<b>Congressional Adds Subtotals</b>	9.685	-

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

N/A

**Remarks**

**D. Acquisition Strategy**

Not applicable.