Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603601F / *Conventional Weapons Technology*							
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	-	144.116	154.618	132.311	0.000	132.311	136.709	125.329	124.906	132.650	Continuing	Continuing
63670A: *Weapon Technology Development*	-	54.786	56.569	68.027	0.000	68.027	85.022	81.427	82.747	92.209	Continuing	Continuing
63670B: *Weapon Concept Development*	-	89.330	98.049	64.284	0.000	64.284	51.687	43.902	42.159	40.441	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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603601F / *Conventional Weapons Technology*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	155.306	187.374	226.278	0.000	226.278
Current President's Budget	144.116	154.618	132.311	0.000	132.311
Total Adjustments	-11.190	-32.756	-93.967	0.000	-93.967
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	10.000			
• Congressional Directed Transfers	0.000	-32.756			
• Reprogrammings	-0.005	0.000			
• SBIR/STTR Transfer	-4.889	0.000			
• Other Adjustments	-6.296	-10.000	-93.967	0.000	-93.967

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 63670B: *Weapon Concept Development*		
Congressional Add: *Next generation affordable direct attack munition*	0.000	10.000
Congressional Add Subtotals for Project: 63670B	0.000	10.000
Congressional Add Totals for all Projects	0.000	10.000

Change Summary Explanation

In FY 2023 the Transformational component effort was realigned under Program 0603032F WARTECH, Project 630320: Air Force Vanguards, effort Vanguard Prospect - Resolute Sentry, effort Vanguard Prospect - Fight Tonight, effort Future Transformational Capabilities, and effort Vanguard Prospect - Long Range Kill Chain.

FY 2023 adjustment of $32.756 million reflects realignment of the Transformational component funding as described above.

FY 2024 adjustment of $93.967 million reflects realignment of the Transformational component funding and a decrease in scope of efforts associated with system-level integration and concept demonstration of technical components/subsystems in deference to higher Air Force priorities.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603601F / *Conventional Weapons Technology*	Project (Number/Name) 63670A / *Weapon Technology Development*	

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
63670A: *Weapon Technology Development*	-	54.786	56.569	68.027	0.000	68.027	85.022	81.427	82.747	92.209	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)	FY 2022	FY 2023	FY 2024
Title: Ordnance Technologies	26.841	27.728	32.626

Description: 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.

FY 2023 Plans:

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 weaponeering 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. Complete research on distributed, collaborative and cooperative effects munition technologies. 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.

FY 2024 Plans:

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

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 3	**R-1 Program Element (Number/Name)** PE 0603601F / *Conventional Weapons Technology*	**Project (Number/Name)** 63670A / *Weapon Technology Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
test capabilities and high-fidelity analysis tools to quickly generate more accurate weaponeering 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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased compared to FY 2023 by $4.898 million. Funding increased due to increased emphasis in high speed ordnance technology and ordnance technologies versus maritime targets.			
Title: Guidance Technologies	27.945	28.841	35.401
Description: Develop guidance technologies to improve the precision, controlled lethality, and flexibility of conventional munitions. Specific technical areas include precision navigation and terminal seekers. ***FY 2023 Plans:*** 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. Continue the design, development, and evaluation of seeker sub-system prototypes for platform self-defense. 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 developing technologies for precision navigation of weapons in Global Positioning System-denied scenarios. Continue maturation and integration of 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. Complete development of sensor test technologies to enable verification of autonomous munition concepts. Continue integrating higher fidelity constructive analysis tools with engagement and mission level modeling and simulation. Continue miniature munition technology integration for ground launch demonstration. Initiate design and development of a weapons digital ecosystem that enables digital engineering and the use of high-fidelity digital twinning across the weapons lifecycle. ***FY 2024 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 3	**R-1 Program Element (Number/Name)** PE 0603601F / *Conventional Weapons Technology*	**Project (Number/Name)** 63670A / *Weapon Technology Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
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 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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased compared to FY 2023 by $6.560 million. Funding increased 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.			
Accomplishments/Planned Programs Subtotals	54.786	56.569	68.027

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603601F / *Conventional Weapons Technology*	Project (Number/Name) 63670B / *Weapon Concept Development*	

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
63670B: *Weapon Concept Development*	-	89.330	98.049	64.284	0.000	64.284	51.687	43.902	42.159	40.441	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)	FY 2022	FY 2023	FY 2024
Title: Air-to-Air Concept Development	38.813	42.284	30.585
Description: 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.			
FY 2023 Plans: 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 prototype 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 lethal 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 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. Complete simulation architectures to assess the trade and synergies between kinetic and directed energy weapons. 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 miniature munition ground launch demonstration. Continue modeling, simulation, analysis, and digital engineering in support of air-to-air advanced weapon technologies.			
FY 2024 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased compared to FY 2023 by $11.699 million. Funding decreased 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.			
Title: Air-to-Ground Concept Development ***Description:*** Mature, integrate, and demonstrate air-to-ground weapon components and systems (ordnance, guidance, and carriage and release technologies) to demonstrate war-fighter capability. ***FY 2023 Plans:*** Complete integration of collaborative weapon technology onto additional weapon systems. Continue technology risk reduction including demonstration and flight testing for weapons concepts responsive to the future threat environment (including hypersonic and high-speed concepts). Complete developing simulation architectures assessing the trades and synergies between kinetic and directed energy weapons. 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. ***FY 2024 Plans:*** 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/	42.047	45.765	33.699

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 3	**R-1 Program Element (Number/Name)** PE 0603601F / *Conventional Weapons Technology*	**Project (Number/Name)** 63670B / *Weapon Concept Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
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. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased compared to FY 2023 by $12.066 million. Funding decreased 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.			
Title: Transformational Component ***Description:*** This funding allocation will initiate new and continue existing Transformational Technology Development efforts. The Transformational Technology Development program will select new projects, in alignment with mission focused areas which include, but are not limited to: Intelligent Planning and Wargaming, Battlespace Awareness, Integrated Base Defense, and Hypersonic Multi-Mission Aircraft. Investments focus on technology development efforts including, but are not limited to technologies to enhance survivability, operability and performance of personnel, sensors, and structures in a threat environment through ordnance and guidance technologies. This investment is overseen by senior representatives from Air and Space Forces who participate in the submission, initial review, and down-selection of Transformational Technology Development proposed efforts. Final selections will be reviewed by the Air Force Deputy Assistant Secretary for Science, Technology, and Engineering before a final recommendation for Congressional approval is made. ***FY 2023 Plans:*** In FY 2023 this effort will be realigned under Program 0603032F WARTECH, Project 630320: Air Force Vanguards, effort Vanguard Prospect - Resolute Sentry, effort Vanguard Prospect - Fight Tonight, effort Future Transformational Capabilities, and effort Vanguard Prospect - Long Range Kill Chain. ***FY 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** N/A	8.470	0.000	0.000
Accomplishments/Planned Programs Subtotals	89.330	88.049	64.284

	FY 2022	FY 2023
Congressional Add: Next generation affordable direct attack munition	0.000	10.000

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 3	**R-1 Program Element (Number/Name)** PE 0603601F / *Conventional Weapons Technology*	**Project (Number/Name)** 63670B / *Weapon Concept Development*

	FY 2022	FY 2023
FY 2022 Accomplishments: Not applicable. ***FY 2023 Plans:*** Conduct Congressionally-directed efforts.		
Congressional Adds Subtotals	0.000	10.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not applicable.