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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force **Date:** May 2021

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305116F / <i>Aerial Targets</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	8.761	0.448	1.528	0.000	1.528	-	-	-	-	-	-
675136: <i>Target Systems Development</i>	-	4.791	0.448	1.528	0.000	1.528	-	-	-	-	-	-
675366: <i>QF-16</i>	-	3.970	0.000	0.000	0.000	0.000	-	-	-	-	-	-

Note

This program, BA 7, PE 0305116F, project 675136, Next Generation Aerial Target (NGAT), is a new start.

A. Mission Description and Budget Item Justification

Full-scale Aerial Targets (FSAT), Subscale Aerial Targets (SSAT), Next Generation Aerial Targets (NGAT) and companion Target Control Systems (TCS) assure the effectiveness and currency of warfighter weapon systems to combat real-world enemy fighters and cruise missiles. Aerial targets support adherence to Public Law Title 10, Section 2366, which requires major systems and munitions programs to conduct live fire survivability and lethality testing before full rate production. Targets are used to validate operational missile/weapon system effectiveness and fighter Operational Flight Program (OFP) updates. Targets are required for developmental/operational testing for all air-to-air and surface-to-air missiles, and for the F-22A, F-35, F-18, F-16, F-15, among other aircraft. Funding supports simulator development and improvements on the QF-16 FSAT, BQM-167A SSAT, NGAT, and updates of Target Control Systems and specialized target payload subsystems for requirements such as: missile scoring, electronic attack (EA), infrared (IR) countermeasures, radar/IR signature augmentation, and chaff and flare dispensing systems. Enables analysis, development and prototyping of threat emulations/simulations, and presentation of evolving threat scenarios and target area environments to prepare for emerging weapons development activities. Development is required to evolve aerial targets and target control capabilities to meet current and future threats. Air Force is the executive agent for full-scale aerial targets. The Navy is the lead service for subscale aerial targets.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0M was expended for civilian pay expenses in this program element, and in FY21 \$0M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	7.448	0.449	1.551	0.000	1.551
Current President's Budget	8.761	0.448	1.528	0.000	1.528
Total Adjustments	1.313	-0.001	-0.023	0.000	-0.023
• Congressional General Reductions	0.000	-0.001			
• 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	1.460	0.000			
• SBIR/STTR Transfer	-0.147	0.000			
• Other Adjustments	0.000	0.000	-0.023	0.000	-0.023

Change Summary Explanation

FY20: Reprogramming supports Electronic Attack (EA) design studies associated with aerial target platforms and their complementary payload subsystems.

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Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0305116F / <i>Aerial Targets</i>				Project (Number/Name) 675136 / <i>Target Systems Development</i>			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
675136: <i>Target Systems Development</i>	-	4.791	0.448	1.528	0.000	1.528	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 7, PE 0305116F, project 675136, Next Generation Aerial Target (NGAT), is a new start.

A. Mission Description and Budget Item Justification

Full-scale Aerial Targets (FSAT), Subscale Aerial Targets (SSAT), Next Generation Aerial Targets (NGAT) and companion Target Control Systems (TCS) assure the effectiveness and currency of warfighter weapon systems to combat real-world enemy fighters and cruise missiles.

The BQM-167A Air Force Subscale Aerial Target (AFSAT) is a reusable jet-powered target aircraft measuring approximately 20 feet long with a mission to simulate threat aircraft for testing and evaluation of surface-to-air, ship-to-air, or air-to-air missiles. The target accomplishes this mission through the use of optional payloads including chaff and flare, electronic attack (EA), and infrared (IR) devices. Funding supports continued improvement of overall performance enhancement efforts to meet evolving threats. Funding supports development, improvements, and updates of target control systems and specialized target payload subsystems for requirements to include, but not limited to: missile scoring, EA and IR countermeasures, radar and IR signature augmentation, chaff and flare dispensing systems, and overall target threat emulation.

EA payload upgrades provide new techniques and capabilities critical to subscale, mid-scale, and full-scale targets to realistically emulate current and emerging foreign threat systems in support of weapons testing.

TCS provides a myriad of sub-systems that, together, deliver the capability to control and track mission aerial targets and to track a mix of other critical mission participants (to include relay platforms, shooters, and the missile system under test). In this role, TCS ensures an optimum integrated aerial target environment that enhances both weapon system assessments and companion aircrew skills, and the full safety of mission participants throughout the conduct and fulfillment of Test and Evaluation (T&E) objectives. Funding supports continued improvement of TCS capabilities to effectively meet the multi-service T&E demands of current and future warfighter weapon systems.

NGAT seeks to conduct early systems engineering and risk reduction activities to identify and mitigate the major risks associated with developing a new aerial target equipped with modern, threat representative, EA and associated subsystems needed for live fire air-to-air missile tests. NGAT seeks to represent as well as keep pace with adversary aircraft developments to present an up to date, realistic target for live-fire testing. These activities include design concept studies, engineering analysis, Radar Cross Section (RCS) measurements, RCS modeling Verification and Validation (V&V), and early prototyping and demonstration events as a proof of concept. Efforts will include engineering and design activities needed to modify prototype airframes with representative EA payloads as well as other subsystems unique to live-fire target missions, including, but not limited to, the design and integration of systems needed for missile scoring, telemetry, and target and payload control. Results

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will lead to informed requirements development as well as indicate viable mid and far term solutions. Successful prototype demonstrations could lead to continued development and acquisition of a limited number of prototypes to continue refining the design and determine viability and cost/schedule risks in follow on efforts.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0M was expended for civilian pay expenses in this program element, and in FY21 \$0M is forecasted for civilian pay expenses in this program element.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
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Title: AFSAT (BQM-167A) Development Description: Provide enhancements to AFSAT (BQM-167A) ability to emulate emerging threats in support of weapon testing. FY 2021 Plans: N/A FY 2022 Plans: Continue system upgrades to support expanded AFSAT capabilities to support achieving emulation of emerging threat targets as our adversaries develop and expand their arsenals. FY 2021 to FY 2022 Increase/Decrease Statement: Funding increased due to FY21 funds being moved to higher service priorities.	3.037	0.025	0.976
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Title: Digital Radio Frequency Memory (DRFM) Description: Develop, improve, and update specialized target payload subsystems, both software and hardware, for requirements to emulate evolving adversary EA, IR, and radar tactics and techniques. These efforts are continuous as new threat intelligence surfaces, and are level of effort projects based on available funding. FY 2021 Plans: N/A FY 2022 Plans: N/A FY 2021 to FY 2022 Increase/Decrease Statement: N/A	0.399	0.000	0.000
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Title: Target Control System Description: Provide system enhancements to Advance Airborne Threat Target Control System (AATTCS), formerly known as Gulf Range Drone Control System (GRDCS), for command and control and tracking of aerial targets. Funding may be utilized for development of control systems for next generation aerial targets.	1.355	0.423	0.453
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p><i>FY 2021 Plans:</i> Continue system upgrades to include, but not limited to, AATTCS software updates to support implementing QF-16, AFSAT, TCS enhancements and future TCS capability assessments.</p> <p><i>FY 2022 Plans:</i> Continue system upgrades to include, but not limited to, AATTCS software updates to support implementing QF-16, AFSAT, NGAT, TCS enhancements and future TCS capability assessments.</p> <p><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i> Funding increased due to manpower needs to address capability gaps in TCS.</p>			
<p><i>Title:</i> Next Generation Aerial Target (NGAT)</p> <p><i>Description:</i> NGAT seeks to conduct early systems engineering and risk reduction activities to identify and mitigate the major risks associated with developing a new aerial target for live fire surface-to-air, ship-to-air, and air-to-air missile tests.</p> <p><i>FY 2021 Plans:</i> N/A</p> <p><i>FY 2022 Plans:</i> Conduct limited initial design efforts to identify risks in future fabrication, installation, and ground/flight test of prototype electronic attack and other associated equipment needed to complete analysis of potential aerial target alternatives.</p> <p><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i> NGAT is a FY22 new start.</p>	0.000	0.000	0.099
Accomplishments/Planned Programs Subtotals	4.791	0.448	1.528

C. Other Program Funding Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• APAF 04 Line Item 10TRGT: <i>Target Drones</i>	130.837	133.273	116.169	-	116.169	-	-	-	-	-	-
• APAF 06 000999: <i>Initials Spares</i>	0.589	0.600	0.600	-	0.600	-	-	-	-	-	-
• APAF 07 000074: <i>War Consumables</i>	4.012	4.757	4.759	-	4.759	-	-	-	-	-	-
• APAF 07 Line Item 000075: <i>Other Production Charges</i>	16.514	16.495	16.450	-	16.450	-	-	-	-	-	-

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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Remarks

RDTE, BA 07: Aerial Targets - Includes funding for BPAC 675366, QF-16.

APAF, BA 04: Target Drones 10TRGT - Full Scale and Subscale Aerial Targets assure warfighters' weapon systems will perform effectively against real-world enemy fighters and cruise missiles. Adheres to Public Law title 10, Section 2366 "Live fire/Lethality" developmental/operational test requirements.

APAF, BA 06: Initial Spares/Repair Parts - Aircraft Initial Spares are required to fill the initial pipeline or inventory for all new aircraft systems, including modifications, support equipment, and other production categories. Initial spares include peculiar repairable and consumable components, assemblies, and sub-assemblies that must be available for issues at all levels of supply in time to support newly fielded end items.

APAF, BA 07: War Consumables - AFSAT Rocket-Assisted Take-Off (RATO) requirements executed at Hill AFB. A RATO is used in the initial launch phase to obtain appropriate speed and altitude.

APAF, BA 07: Other Production Charges - ALQ-167 and/or DLQ-9 Electronic Attack (EA) payloads for target drones including support equipment. Payloads emulate threat aircraft electronic countermeasures and jamming capabilities.

D. Acquisition Strategy

The AFSAT acquisition strategy is a sole source follow-on contract. The Target Control System acquisition strategy includes several small projects to provide enhancements to TCS (to include AATTCS) and will be accomplished with other government agencies and contracts as needed. EA Payloads acquisition strategy includes several small projects managed by the US Navy program office to provide enhancements to the target payloads for aerial targets. Similarly, the acquisition strategy for NGAT includes multiple contract awards to various contractors as well as support from other government agencies.

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force **Date:** May 2021

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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

Target System Development	
BQM-167A: AFSAT GAPP	
TCS: Future TCS	
EA Pods: Multi-Channel Digital Radio Frequency Memory (DRFM); Hardware	
EA Pods: Multi-Channel Digital Radio Frequency Memory (DRFM); Software Spiral Upgrade	
NGAT: Analysis	

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Target System Development</i>				
BQM-167A: AFSAT GAPP	3	2020	3	2023
TCS: Future TCS	1	2020	4	2026
EA Pods: Multi-Channel Digital Radio Frequency Memory (DRFM); Hardware	1	2020	3	2022
EA Pods: Multi-Channel Digital Radio Frequency Memory (DRFM); Software Spiral Upgrade	1	2020	3	2022
NGAT: Analysis	1	2022	3	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force										Date: May 2021		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0305116F / <i>Aerial Targets</i>				Project (Number/Name) 675366 / <i>QF-16</i>			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
675366: <i>QF-16</i>	-	3.970	0.000	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Full-scale Aerial Targets (FSAT) ensure warfighters' weapon systems perform effectively against real-world enemy fighters and cruise missiles. Aerial targets support adherence to Public Law Title 10, Section 2366, which requires major systems and munitions programs to conduct live fire survivability and lethality testing before full-rate production. Targets are used to validate operational missile/weapon system effectiveness and fighter Operational Flight Program (OFP) updates. Targets are required for developmental/operational testing for all air-to-air and surface-to-air missiles, and for the F-22A, F-35, F-18, F-16, F-15 aircraft, among other aircraft. Funding supports simulator development and improvements on the QF-16 FSAT, and updates of Target Control Systems (TCS) and specialized target payload subsystems for requirements such as: missile scoring, electronic attack (EA) and infrared (IR) countermeasures, radar and IR signature augmentation, and chaff and flare dispensing systems. Development is required to evolve QF-16 threat capabilities to better meet 5th generation threat representation which includes, but not limited to, additional simultaneous operation of payloads, improved RCS, and other characteristics to enable current and future test objectives to be met.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0M was expended for civilian pay expenses in this program element, and in FY21 \$0M is forecasted for civilian pay expenses in this program element.

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

	FY 2020	FY 2021	FY 2022
Title: QF-16 Development Program	3.970	0.000	0.000
Description: Provide enhancements to emulate emerging threat(s) in support of weapons testing. Funding may be utilized for development of follow-on aerial target capabilities.			
FY 2021 Plans: N/A			
FY 2022 Plans: N/A			
FY 2021 to FY 2022 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	3.970	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Air Force **Date:** May 2021

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305116F / <i>Aerial Targets</i>	Project (Number/Name) 675366 / <i>QF-16</i>
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 04 Line Item 10TRGT: <i>Target Drones</i>	130.837	133.273	116.169	-	116.169	-	-	-	-	-	-
• APAF 06 000999: <i>Initial Spares</i>	0.589	0.600	0.600	-	0.600	-	-	-	-	-	-
• APAF 07 000074: <i>War Consumables</i>	4.012	4.757	4.759	-	4.759	-	-	-	-	-	-
• APAF 07 Line Item 00075: <i>Other Production Charges</i>	16.514	16.495	16.450	-	16.450	-	-	-	-	-	-

Remarks

RDTE, BA07: Aerial Targets - Includes BPAC 675136, Target Systems Development.

APAF, BA 04: Target Drones 10TRGT - Full Scale and Subscale Aerial Targets assure warfighter's weapon systems will perform effectively against real-world enemy fighters and cruise missiles. Adheres to Public Law title 10, Section 2366 "Live fire/Lethality" developmental/operational test requirements.

APAF, BA 06: Initial Spares/Repair Parts - Aircraft Initial Spares are required to fill the initial pipeline or inventory for all new aircraft systems, including modifications, support equipment, and other production categories. Initial spares include peculiar repairable and consumable components, assemblies, and sub-assemblies that must be available for issues at all levels of supply in time to support newly fielded end items.

APAF, BA 07: War Consumables - AFSAT Rocket-Assisted Take-Off (RATO) requirements executed at Hill AFB. A RATO is used in the initial launch phase to obtain appropriate speed and altitude.

APAF, BA 07: Other Production Charges - ALQ-167 and/or DLQ-9 Electronic Attack (EA) payloads for target drones including support equipment. Payloads emulate threat aircraft electronic countermeasures and jamming capabilities.

D. Acquisition Strategy

Initial QF-16 contract was a competitively awarded contract that included development and production options. Any future development efforts to provide capability upgrades to improve target presentation, tracking, control, or to keep the platform current, may be awarded separately. Evaluation is currently underway to award a sole source follow-on production and sustainment contract to the incumbent for Lots 6-8.

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force	Date: May 2021
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<i>QF-16 Development Programs</i>	
QF-16 Multi-Payload Control (MPC)	

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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305116F / <i>Aerial Targets</i>	Project (Number/Name) 675366 / QF-16
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>QF-16 Development Programs</i>				
QF-16 Multi-Payload Control (MPC)	1	2020	1	2022