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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Air Force **Date:** May 2017

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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	2.578	3.051	21.295	0.000	21.295	1.446	1.505	1.532	1.566	Continuing	Continuing
675136: <i>Target Systems Development</i>	-	1.092	1.915	5.029	0.000	5.029	1.446	1.505	1.532	1.566	Continuing	Continuing
675366: <i>QF-16</i>	-	1.486	1.136	16.266	0.000	16.266	0.000	0.000	0.000	0.000	0.000	18.888

A. Mission Description and Budget Item Justification

Full-scale and subscale Aerial Targets assure warfighter's weapon systems will perform effectively against real-world enemy fighters and cruise missiles. Aerial Targets provide adherence to Public Law Title 10, Section 2366 "Live Fire/Lethality" developmental/operational test requirements. Targets are used to validate operational missile/weapon system effectiveness and fighter Operational Flight Program (OFP) updates. Targets are essential for development testing/operational testing for all air-to-air and surface-to-air missiles, and for the F-22A, F-35, F-18, F-16, and F-15, aircraft. The objective is to provide realistic targets for missile testing to enable the development of offensive counter-air systems (air-to-air and surface-to-air) capable of defeating changing enemy airborne threats. This program element funds development, improvements, and updates of full-scale/subscale aerial targets and target control systems to ensure aerial targets represent enemy threat airborne systems. Specialized target payload subsystems are developed for requirements to include but not limited to missile scoring, electronic attack, electronic countermeasures and infrared (IR) countermeasures, radar and IR signature augmentation, and chaff and flare dispensing systems.

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 year.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	2.515	3.051	2.334	0.000	2.334
Current President's Budget	2.578	3.051	21.295	0.000	21.295
Total Adjustments	0.063	0.000	18.961	0.000	18.961
• 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	0.000	0.000			
• Other Adjustments	0.063	0.000	18.961	0.000	18.961

Change Summary Explanation

FY18 increase of \$18.961M for enhancements to the QF-16 electronic attack infrared signature

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Air Force										Date: May 2017		
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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
675136: <i>Target Systems Development</i>	-	1.092	1.915	5.029	0.000	5.029	1.446	1.505	1.532	1.566	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Full-scale aerial targets, subscale aerial targets, 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, and infrared devices. Funding supports continued improvement of launch phase performance and overall performance enhancement efforts. 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, electronic attack and infrared (IR) countermeasures, radar and IR signature augmentation, and chaff and flare dispensing systems.

Electronic Attack (EA) pod upgrade provides new techniques and capabilities critical to subscales and full-scales to realistically emulate foreign threat systems in support of weapons testing.

TCS provides a myriad of sub-systems that together delivers the capability to control and track mission aerial targets (full-scale and subscale) 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, all the while assuring the full safety of mission participants throughout the conduct and fulfillment of T&E objectives. Funding supports continued improvement (modernization) of TCS capabilities to effectively meet the multi-service T&E demands of current and future warfighter weapon systems.

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

	FY 2016	FY 2017	FY 2018
Title: BQM-167A Development	0.000	0.049	1.340
Description: Provide enhancements to the radar cross section and infrared signature with accompanying test and integration. Begin development activities for an alternate launch system.			
FY 2016 Accomplishments: N/A			
FY 2017 Plans:			

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Air Force		Date: May 2017		
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305116F / Aerial Targets	Project (Number/Name) 675136 / Target Systems Development		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
Continue BQM-167A improvement efforts. Conduct research and analysis on potential affordable, subscale aerial target platform concepts, support user requirements generation for alternate launch capabilities to the current AFSAT platform and improve target endurance. FY 2018 Plans: Continue BQM-167A improvement efforts. Conduct research and analysis on potential affordable, subscale aerial target platform concepts, support user requirements generation for the current AFSAT platform and improve target endurance.				
Title: Target Control System Description: Provide system modernization enhancements to Target Control System Gulf Range Drone Control System, (GRDCS) for command and control and tracking of Aerial Targets. FY 2016 Accomplishments: Continued system modernization enhancements to Target Control System for command and control, tracking of Aerial Targets, Utah Test and Training Range Upgrade, and Loss of Carrier Waypoint. FY 2017 Plans: Continue system modernization enhancements to include but not limited to GRDCS software updates to support QF-16 Full Operational Capability at Holloman AFB and future TCS capability assessment. FY 2018 Plans: Continue system modernization enhancements to include but not limited to GRDCS software updates to support QF-16 Full Operational Capability at Holloman AFB and future TCS capability assessment.		0.378	1.178	2.389
Title: Digital Radio Frequency Memory (DRFM) Description: Upgrade existing and develop new electronic attack (EA) pod hardware and software used on QF-16 and subscales to emulate evolving adversary EA tactics and techniques. FY 2016 Accomplishments: Continued efforts to upgrade existing and develop new EA pod hardware and software used on QF-16 and subscales to emulate evolving adversary EA tactics and techniques. FY 2017 Plans: Continue efforts to upgrade existing and develop new EA pod hardware and software used on QF-16 and subscales to emulate evolving adversary EA tactics and techniques. FY 2018 Plans:		0.714	0.688	1.300

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Appropriation/Budget Activity 3600 / 7				R-1 Program Element (Number/Name) PE 0305116F / Aerial Targets				Project (Number/Name) 675136 / Target Systems Development				
B. Accomplishments/Planned Programs (\$ in Millions)										FY 2016	FY 2017	FY 2018
Continue efforts to upgrade existing and develop new EA pod hardware and software used on QF-16 and subscales to emulate evolving adversary EA tactics and techniques.												
Accomplishments/Planned Programs Subtotals										1.092	1.915	5.029
C. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost	
• APAF:BA04: Line Item # 10TRGT: Target Drones	131.879	114.656	109.841	0.000	109.841	148.394	131.875	134.579	137.274	Continuing	Continuing	
• APAF: BA06: Line Item # 000999: Initial Spares/Repair Parts	0.537	0.595	0.596	0.000	0.596	0.584	0.594	0.606	0.618	Continuing	Continuing	
• APAF: BA07: Line Item # 000074: War Consumables	0.000	4.460	4.560	0.000	4.560	4.636	4.044	4.804	4.900	Continuing	Continuing	
• APAF: BA07: Line Item # 000075: Other Production Charges	7.969	19.345	15.780	0.000	15.780	11.768	12.146	12.157	12.437	Continuing	Continuing	
• OPAF: BA03: Line Item # 834190: Combat Training Ranges	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	5.546	
Remarks												
D. Acquisition Strategy												
The AFSAT acquisition strategy is sole source follow-on with fixed price and time and materials contracts. The Target Control System acquisition strategy includes several small projects to provide enhancements to Target Control System (to include GRDCS) and will be accomplished with other government agencies and contracts as needed. EA Pods acquisition strategy includes several small projects managed by the US Navy program office to provide enhancements to the target payloads for subscale and full-scale targets.												
E. Performance Metrics												
Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.												

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Air Force										Date: May 2017		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0305116F / Aerial Targets				Project (Number/Name) 675366 / QF-16			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
675366: QF-16	-	1.486	1.136	16.266	0.000	16.266	0.000	0.000	0.000	0.000	0.000	18.888
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Full-scale Aerial Targets assure 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 survivability and lethality testing before full-rate production. The Aerial Targets program provides targets to satisfy "Live Fire/Lethality" developmental/operational test requirements. 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, and F-15, aircraft. The United States Air Force's (USAF) Air Superiority Modernization/ Mission Area Plan has identified aerial targets as a capability shortfall; the QF-16 program will fulfill this requirement. Funding supports continued development of the follow-on full-scale aerial target (QF-16) and simulators, development, improvements, and updates of target control systems and specialized target payload subsystems for requirements such as: missile scoring, electronic attack 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 meet current and future threats identified by OSD.

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

	FY 2016	FY 2017	FY 2018
Title: QF-16 Development Program	1.486	1.136	16.266
Description: QF-16 Development Program			
FY 2016 Accomplishments: Continued threat realism improvements. Conducted studies and analysis, including future F-16 Block Studies and Development.			
FY 2017 Plans: Continue threat realism improvements to include but not limited to radar cross section (RCS) reduction and improved countermeasures. Conduct studies and analysis, including future F-16 Block Studies and Development.			
FY 2018 Plans: Continue threat realism improvements to include but not limited to radar cross section (RCS) reduction and improved countermeasures and their control. Conduct studies and analysis, including future F-16 Block Studies and Development.			
Accomplishments/Planned Programs Subtotals	1.486	1.136	16.266

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Air Force	Date: May 2017
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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 / <i>QF-16</i>
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF: BA 04: Line Item # 10TRGT: <i>Target Drones</i>	131.879	114.656	109.841	0.000	109.841	148.394	131.875	134.579	137.274	Continuing	Continuing
• APAF: BA 06: Line Item # 000999: <i>Initial Spares/Repair Parts</i>	0.537	0.595	0.596	0.000	0.596	0.584	0.594	0.606	0.618	Continuing	Continuing
• APAF: BA 07: Line Item # 000074: <i>War Consumables</i>	0.000	4.460	4.560	0.000	4.560	4.636	4.044	4.804	4.900	Continuing	Continuing
• APAF: BA 07: Line Item # 000075: <i>Other Production Charges</i>	7.969	19.345	15.780	0.000	15.780	11.768	12.146	12.157	12.437	Continuing	Continuing

Remarks

D. Acquisition Strategy

The QF-16 was a competitive contract award, including fixed price incentive development contract with fixed priced production options (Lots 1-5). In FY19, planning is in progress to award a sole source follow-on production and sustainment contract to the incumbent for Lots 6-8.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Air Force													Date: May 2017		
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>					
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Drone Peculiar Equipment	C/Various	The Boeing Company : Saint Louis, MO	-	1.486	Dec 2015	1.136	Mar 2017	16.266	Mar 2018	0.000		16.266	Continuing	Continuing	-
Subtotal			-	1.486		1.136		16.266		0.000		16.266	-	-	-
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			-	-		-		-		-		-	-	-	-
Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			-	-		-		-		-		-	-	-	-
Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			-	-		-		-		-		-	-	-	-
			Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	1.486		1.136		16.266		0.000		16.266	-	-	-
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Air Force	Date: May 2017
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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 / <i>QF-16</i>
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	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
Threat Realism Improvements																												
Electronic Flight Termination System / Loss of Carrier																												
Future F-16 Block Studies and Development																												
Radar Cross Section Model Development																												

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Air Force			Date: May 2017
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>	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Threat Realism Improvements	3	2017	3	2022
Electronic Flight Termination System / Loss of Carrier	1	2016	2	2018
Future F-16 Block Studies and Development	1	2016	3	2018
Radar Cross Section Model Development	1	2016	2	2017

Note

Radar Cross Section Model Development schedule phased approach was consolidated from previous version due to earlier availability of funds.