Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force											Date: February 2019	
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0604233F / *Specialized Undergraduate Flight Training*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	-	6.269	11.344	2.584	0.000	2.584	5.368	3.613	2.041	2.502	Continuing	Continuing
674101: *Undergraduate Remotely Piloted Aircraft Training*	-	0.731	0.771	0.796	0.000	0.796	0.810	0.827	0.842	0.857	Continuing	Continuing
676035: *T-6 Operational System Development*	-	3.600	1.776	1.183	0.000	1.183	2.105	0.226	0.232	0.391	Continuing	Continuing
676037: *T-38 Operational System Development*	-	1.938	8.797	0.605	0.000	0.605	2.453	2.560	0.967	1.254	Continuing	Continuing

Note

This program, BA 7, PE 0604233F, project 676035, Next Generation On-Board Oxygen Generation System, is a new start.
This program, BA 7, PE 0604233F, project 676035, Controlled Flight Into Terrain - Prevention (CFIT-Prevention), is a new start.

A. Mission Description and Budget Item Justification

Supports Air Education and Training Command's implementation of Specialized Undergraduate Pilot Training and the Department of Defense initiative for joint pilot training.

Undergraduate Remotely Piloted Aircraft Training supports Air Education and Training Command's implementation of Undergraduate Remotely Piloted Aircraft Training. This program provides and maintains the currency of Predator Reaper Integrated Mission Environment Desktop Training System.

T-6 Operational System Development continues follow on development activities to JPATS including but not limited to studies & development efforts, instructional courseware, and logistics support to include Diminishing Manufacturing Sources(DMS) and development activities related to DMS. Included is development for the Next Generation On-Board Oxygen Generation System, Automatic Dependent Surveillance Broadcast Out (ADS-B Out), Crash Survivable Recorder (CSR),Controlled Flight Into Terrain - Prevention (CFIT-Prevention), Pilot Training Next (PTN) and associated upgrades. There are currently 444 aircraft in the Air Force inventory. The aircraft were designed with a 24 year service life. Remaining service life is up to 16 years from the final delivery in May 2010.

The T-38 program continues studies & development efforts supporting future ACAT III Engineering Change Proposals to address DMS issues and the regular block upgrades required to keep the system current. Block upgrades incorporate software and/or hardware improvements for the aircraft and aircrew training devices to address flight safety issues and to comply with new capabilities mandated by Department of Defense, Federal Aviation Administration, or National Airspace System.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force	Date: February 2019
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0604233F / *Specialized Undergraduate Flight Training*

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Specialized Undergraduate Flight Training capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F, and 0605833F.

The FY 2020 funding request was reduced by $0.659 million to account for the availability of prior year execution balances.

As directed in the FY 2018 NDAA, Sec 825, amendment to PL 114-92 FY 2016 NDAA, Sec 828 Penalty for Cost Overruns, the FY 2018 Air Force penalty total is $14.373M. The calculated percentage reduction to each research, development, test and evaluation and procurement account will be allocated proportionally from all programs, projects, or activities under such account.

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.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	5.776	11.344	3.243	0.000	3.243
Current President's Budget	6.269	11.344	2.584	0.000	2.584
Total Adjustments	0.493	0.000	-0.659	0.000	-0.659
• 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	0.700	0.000			
• SBIR/STTR Transfer	-0.207	0.000			
• Other Adjustments	0.000	0.000	-0.659	0.000	-0.659

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force			Date: February 2019
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604233F / *Specialized Undergraduate Flight Training*	Project (Number/Name) 674101 / *Undergraduate Remotely Piloted Aircraft Training*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
674101: *Undergraduate Remotely Piloted Aircraft Training*	-	0.731	0.771	0.796	0.000	0.796	0.810	0.827	0.842	0.857	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This effort supports Air Education and Training Command's (AETC) implementation of Undergraduate Remotely Piloted Aircraft (RPA) Training (URT). URT produces RPA pilots and Sensor Operators from accession sources to man RPA squadrons. Success of the program is heavily dependent on Predator Reaper Integrated Mission Environment (PRIME) Desktop Training System to prepare undergraduate students for entry in RPA Formal Training Units (FTU). PRIME has completed seven Phases of development and is now at baseline functionality. PRIME is a desktop trainer similar to the Reaper training system now in use to train undergraduate RPA pilots and sensor operators. PRIME currently emulates the MQ-9 Reaper and needs to keep pace with that baseline system and expand to other RPAs in order to maintain concurrency and relevancy. Funds will also be used to develop enhancements that increase fidelity and functionality. Funds may be used to address emerging and short-notice Diminishing Manufacturing Sources and Material Shortage (DMSMS) issues. Diminishing Manufacturing Sources efforts include removal of end-of-life software/hardware within simulators systems and move to a modular, common open system architecture that is sustainable and cyber-resilient. Implementation requirements and standards are defined under the Simulator Common Architecture Requirements and Standards (SCARS) initiative. This program element may include necessary civilian pay expenses required to manage, execute, and deliver URT weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Predator Reaper Integrated Mission Environment (PRIME) support	0.731	0.771	0.796	0.000	0.796
Description: Add Phase 8 operational capabilities. ***FY 2019 Plans:*** -Plan, develop, and implement Phase 8 enhancements. -Continue to extend and enhance interoperability between PRIME and Modern Air Combat Environment (MACE) software for instructor operations and entity generation. -Add metadata crosshair coordinates option in MGRS format (10 digit precision). -Add multisegment line drawing tool to tracker screen. -Add aircraft response to icing. -Add load/save capability. -Implement altimeter display, status messages, and engine feedback on HUD.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604233F / *Specialized Undergraduate Flight Training*	**Project (Number/Name)** 674101 / *Undergraduate Remotely Piloted Aircraft Training*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
-Increase functionality/variety/fidelity of MACE PRIME entities. ***FY 2020 Base Plans:*** -Continue development and implementation of Phase 8 enhancements. -Continue to extend and enhance interoperability between PRIME and Modern Air Combat Environment (MACE) software for instructor operations and entity generation. -Add metadata crosshair coordinates option in MGRS format (10 digit precision). -Add multisegment line drawing tool to tracker screen. -Add aircraft response to icing. -Add load/save capability. -Implement altimeter display, status messages, and engine feedback on HUD. -Increase functionality/variety/fidelity of MACE PRIME entities. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Inflation adjustment					
Accomplishments/Planned Programs Subtotals	0.731	0.771	0.796	0.000	0.796

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Contract via Training Systems Acquisition III (TSA III) to Cubic Corporation, parent company of PRIME software data rights owner (Intific).

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604233F / *Specialized Undergraduate Flight Training*	**Project (Number/Name)** 674101 / *Undergraduate Remotely Piloted Aircraft Training*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Undergraduate Remotely Piloted Aircraft Training Phased planning, design, and development of software updates	SS/FFP	Cubic Corporation : NV	-	0.688	Mar 2018	0.707	Mar 2019	0.726	Mar 2020	-		0.726	Continuing	Continuing	-
		Subtotal	-	0.688		0.707		0.726		-		0.726	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Undergraduate Remotely Piloted Aircraft Training PMA	SS/CPFF	Program Office : WPAFB, OH	-	0.043	Oct 2017	0.064	Oct 2018	0.070	Oct 2019	-		0.070	Continuing	Continuing	-
		Subtotal	-	0.043		0.064		0.070		-		0.070	Continuing	Continuing	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.731		0.771		0.796		-		0.796	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604233F / *Specialized Undergraduate Flight Training*	**Project (Number/Name)** 674101 / *Undergraduate Remotely Piloted Aircraft Training*

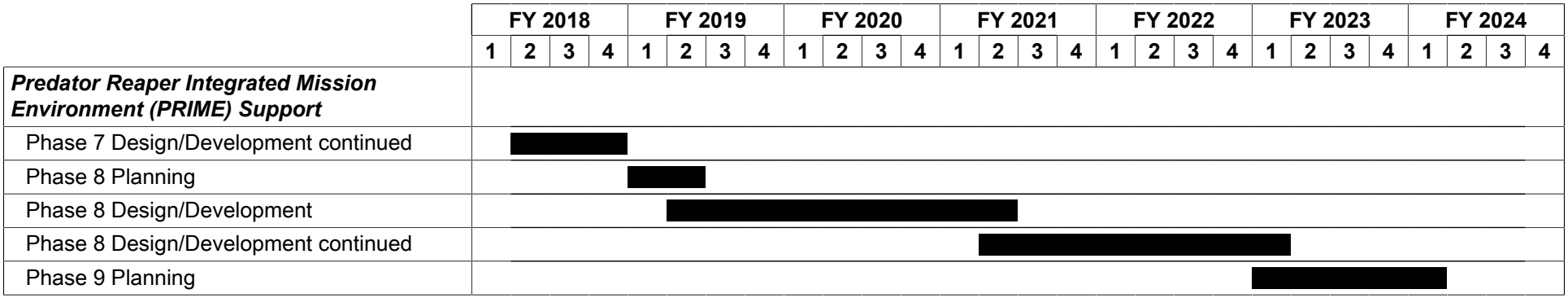

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604233F / *Specialized Undergraduate Flight Training*	**Project (Number/Name)** 674101 / *Undergraduate Remotely Piloted Aircraft Training*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Predator Reaper Integrated Mission Environment (PRIME) Support				
Phase 7 Design/Development continued	2	2018	4	2018
Phase 8 Planning	1	2019	2	2019
Phase 8 Design/Development	2	2019	2	2021
Phase 8 Design/Development continued	2	2021	1	2023
Phase 9 Planning	1	2023	1	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force			Date: February 2019
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604233F / *Specialized Undergraduate Flight Training*	Project (Number/Name) 676035 / *T-6 Operational System Development*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
676035: *T-6 Operational System Development*	-	3.600	1.776	1.183	0.000	1.183	2.105	0.226	0.232	0.391	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 7, PE 0604233F, project 676035, Next Generation On-Board Oxygen Generation System, is a new start.
This program, BA 7, PE 0604233F, project 676035, Controlled Flight Into Terrain - Prevention (CFIT-Prevention), is a new start.

A. Mission Description and Budget Item Justification

T-6 Operational System Development continues follow on development activities to JPATS including but not limited to studies and development efforts, instructional courseware, and logistics support to include Diminishing Manufacturing Sources (DMS) and development activities related to DMS. Included is development for the Next Generation On-Board Oxygen Generation System, Automatic Dependent Surveillance Broadcast Out (ADS-B Out), Crash Survivable Recorder (CSR),Controlled Flight Into Terrain - Prevention (CFIT-Prevention), Pilot Training Next (PTN) and associated upgrades. There are currently 444 aircraft in the Air Force inventory. The aircraft were designed with a 24 year service life. Remaining service life is up to 16 years from the final delivery in May 2010.

Funding contained in this platform's documentation directly aids Air Education Training Command flying training enterprise to continue its overall pilot production increase starting in FY2020 thus reducing the USAF Pilot Shortage.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: T-6A (JPATS) Studies and Analysis	2.549	1.576	0.100	-	0.100
Description: T-6A (JPATS) studies and development activities including but not limited to: Engine Preservation/ Upgrade Development, On-Board Oxygen Generation System (OBOGS) Characterization Study, Next Generation On-Board Oxygen Generation System Study, Supplemental Oxygen System Study, Cockpit Environmental Monitoring/Analysis, and Physiological Events (PE) Analysis. Includes engineering and contractor support/services and PMA costs.					
FY 2019 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604233F / *Specialized Undergraduate Flight Training*	**Project (Number/Name)** 676035 / *T-6 Operational System Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
T-6A Aircraft studies and development activities including but not limited to: Engine Preservation development, Physiological Events (PE) Analysis, On-Board Oxygen Generation System Characterization Study, Next Generation On-Board Oxygen Generation System Study, and Cockpit Environmental Monitoring/Analysis. ***FY 2020 Base Plans:*** T-6A Aircraft studies and development activities including but not limited to: Engine Preservation development, On-Board Oxygen Generation System Characterization Study, Next Generation On-Board Oxygen Generation System Study, and Cockpit Environmental Monitoring/Analysis. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Funds decreased $1.4M supporting T-6 studies and development activities.					
Title: Next Generation On-Board Oxygen Generation System ***Description:*** The Next Generation On-Board Oxygen Generation System will provide the aircraft with a system that will meet and/or exceed the Military Standard 3050 specifications. The development and fielding of this capability will directly improve the safety of pilot training. This acquisition is a direct response to Air Education and Training Command requirements and on-going Physiological Events (PE) in the T-6A aircraft. ***FY 2020 Base Plans:*** Begin RDT&E activities to include but not limited to: development, integration, test and certification of the Next Generation On-Board Oxygen Generation System that meets or exceeds Mil Standard 3050 specifications. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Next Generation On-Board Oxygen Generation System is a new start program with the acquisition lifecycle beginning in Fiscal Year 2020. Therefore, the increase in required funding from FY19 to FY20 is a direct result of the program initiating RDT&E activities.	-	-	0.703	-	0.703
Title: Crash Survivable Recorder (CSR) ***Description:*** Crash Survivable Recorder (CSR) will provide the aircraft with a system that will meet the minimum crash survivable data collection capability as outlined in Air Force Instruction 63-133 Aircraft Information Program (Change 1, 4 November 2010) and SECDEF Memo of 22 June 06, Reducing Preventable Accidents. Includes engineering and contractor support/services and PMA costs. ***FY 2019 Plans:***	0.000	0.200	0.280	-	0.280

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604233F / *Specialized Undergraduate Flight Training*	**Project (Number/Name)** 676035 / *T-6 Operational System Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Begin RDT&E activities to include but not limited to: development, integration, test and certification of the Crash Survivable Recorder (CSR) to comply with the minimum crash survivable data collection capability as outlined in AFI 63-133 Aircraft Information Program 6 February 2001 Incorporating Change 1, 4 November 2010, and the Secretary of Defense Memo of 22 June 06, Reducing Preventable Accidents. ***FY 2020 Base Plans:*** Continue RDT&E activities to include but not limited to: development, integration, test and certification of the Crash Survivable Recorder (CSR) to comply with the minimum crash survivable data collection capability as outlined in AFI 63-133 Aircraft Information Program 6 February 2001 Incorporating Change 1, 4 November 2010, and the Secretary of Defense Memo of 22 June 06, Reducing Preventable Accidents. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The Crash Survivable Recorder (CSR) program starts its acquisition lifecycle beginning in Fiscal Year 2019. Therefore, the increase in the required funding from FY19 to FY20 is a direct result of the program ramping up RDT&E activities.					
Title: Controlled Flight Into Terrain - Prevention (CFIT-Prevention) ***Description:*** Controlled Flight Into Terrain - Prevention (CFIT-Prevention) enhances pilot situational awareness (SA) by providing cues and warnings to prevent an aircraft from being flown into land, water or obstacles. The development and fielding of this capability will directly enhance the safety of pilot training and prevent loss of aircraft and more importantly aircrew. This acquisition is a direct response to the Secretary of Defense Memo of 22 June 06, Reducing Preventable Accidents. Includes engineering, contractor support/services and PMA costs. ***FY 2020 Base Plans:*** Begin RDT&E activities to include but not limited to: development, integration, test and certification of the Controlled Flight Into Terrain - Prevention (CFIT-Prevention) to comply with the Secretary of Defense Memo of 22 June 06, Reducing Preventable Accidents. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Controlled Flight Into Terrain - Prevention (CFIT-Prevention) is a new start program with the acquisition lifecycle beginning in Fiscal Year 2020. Therefore, the increase in required funding from FY19 to FY20 is a direct result of the program initiating RDT&E activities.	-	-	0.100	-	0.100
Title: Pilot Training Next (PTN)	0.000	0.000	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604233F / *Specialized Undergraduate Flight Training*	**Project (Number/Name)** 676035 / *T-6 Operational System Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Description: Pilot Training Next (PTN) is development of experimental/advanced aircrew training concepts, methods and aircraft equipment associated with programs that directly aid Air Education Training Command's (AETC) flight training enterprise, reduce overall pilot training costs and continue AETC's overall pilot production increase starting in FY 2020 thus reducing the USAF Pilot Shortage. ***FY 2019 Plans:*** N/A ***FY 2020 Base Plans:*** Begin RDT&E activities to include but not limited to: development, integration, test and evaluation of the Pilot Training Next (PTN) experimental/advanced aircrew training concepts to aid Air Education Training Command (AETC). ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Pilot Training Next program acquisition lifecycle beginning in Fiscal Year 2020. Therefore, the increase in required funding from FY19 to FY20 is a direct result of the program initiating RDT&E activities.					
Title: T-6 Avionics Upgrades for FAA (Federal Aviation Administration) Compliance ***Description:*** The T-6 Automatic Dependent Surveillance Broadcast (ADS-B) Out program includes but is not limited to the component selection, integration, test and certification of ADS-B Out capability for the T-6A aircraft and Ground Based Training System (GBTS) to meet FAA compliance. Includes engineering and contractor support/services and PMA costs. ***FY 2019 Plans:*** The Automatic Dependent Surveillance Broadcast (ADS-B Out) program will begin full rate production in FY19. As such, RDT&E activities for ADS-B Out is planned to conclude after FY18 which would result in a zero dollar requirement for FY19. ***FY 2020 Base Plans:***	1.051	0.000	0.000	-	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604233F / *Specialized Undergraduate Flight Training*	**Project (Number/Name)** 676035 / *T-6 Operational System Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
The Automatic Dependent Surveillance Broadcast (ADS-B Out) program will begin full rate production in FY19. As such, RDT&E activities for ADS-B Out is planned to conclude after FY18 which would result in a zero dollar requirement for FY20. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** N/A					
Accomplishments/Planned Programs Subtotals	3.600	1.776	1.183	0.000	1.183

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• APAF 06 Line Item 000999: *Initial Spares/Repair Parts*	2.046	0.590	0.100	-	0.100	1.568	2.092	0.571	1.916	Continuing	Continuing
• APAF 05 Line Item JPAT00: *T-6*	35.706	22.550	11.609	-	11.609	32.059	14.161	6.157	3.214	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Air Force is lead service for the T-6 Operational Systems Development program and currently manages upgrades to the entire family of systems for both the Air Force and Navy. T-6 Operational Systems Development acquisition strategy for satisfying emerging software and hardware requirements is designed to enable competition and control cost. Development resulting from Diminishing Manufacturing Sources and Material Shortages requirement will be evaluated and implemented incrementally to efficiently deliver required capabilities to AETC.

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604233F / *Specialized Undergraduate Flight Training*	**Project (Number/Name)** 676035 / *T-6 Operational System Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
T-6 Operational System Development Avionics Upgrades for FAA Compliance	C/FFP	Scientific Research Corp : Atlanta, GA	-	1.051	Mar 2018	-		-		-		-	Continuing	Continuing	3.536
T-6 Operational System Development Crash Survivable Recorder	C/FFP	TBD : TBD	-	-		0.200	Aug 2019	0.280	Dec 2019	-		0.280	Continuing	Continuing	-
T-6 Operational System Development Controlled Flight Into Terrain - Prevention	C/FFP	TBD : TBD	-	-		-		0.100	Aug 2020	-		0.100	Continuing	Continuing	-
T-6 Operational System Development Alternative On-Board Oxygen Generation System	C/CPAF	Not specified. : TBD	-	-		-		0.703	Feb 2020	-		0.703	Continuing	Continuing	-
		Subtotal	-	1.051		0.200		1.083		-		1.083	Continuing	Continuing	N/A

Remarks

The first piece of the Automatic Surveillance Broadcast Out (ADS-B Out) RDT&E effort was awarded in 4Q FY17. The second piece of the ADS-B Out RDT&E effort was awarded in 1Q FY18.

The first piece of the Crash Survivable Recorder RDT&E effort is planned to begin in 4Q FY19. The second piece of the Crash Survivable Recorder RDT&E effort will be awarded in 1Q FY20.

The first piece of the Controlled Flight Into Terrain - Prevention RDT&E effort will be awarded in 4Q FY20.

The first piece of the Next Generation On-Board Oxygen System RDT&E effort is planned to begin in 2Q FY20.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Physiological Event's: Edwards Test Center	PO	Edwards Test Center : Edwards, CA	-	1.670	Apr 2018	1.516	Oct 2018	0.100	Oct 2019	-		0.100	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604233F / *Specialized Undergraduate Flight Training*	**Project (Number/Name)** 676035 / *T-6 Operational System Development*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Physiological Event's: 711th Human Performance Wing	MIPR	Wright Patterson AFB : WPAFB, OH	-	0.452	May 2018	-		-		-		-	Continuing	Continuing	-
Avionics System Flight Test	MIPR	VX-20: NAS Patuxent River : MD	-	0.340	Jan 2018	-		-		-		-	Continuing	Continuing	-
Spectrum Management Support	Various	Not specified. : OH	-	0.022	Mar 2018	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	2.484		1.516		0.100		-		0.100	Continuing	Continuing	N/A

Remarks

Continue Unknown Physiological Event's studies at Edwards AFB. Phase II of this effort will begin 1Q in FY19.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PMA Contract Support	C/FFP	Not specified. : TBD	-	0.010	Sep 2018	0.010	Sep 2019	-		-		-	Continuing	Continuing	-
Government Travel	Various	Not specified. : TBD	-	0.055	Sep 2018	0.050	Sep 2019	-		-		-	Continuing	Continuing	-
		Subtotal	-	0.065		0.060		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	3.600		1.776		1.183		-		1.183	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604233F / *Specialized Undergraduate Flight Training*	**Project (Number/Name)** 676035 / *T-6 Operational System Development*

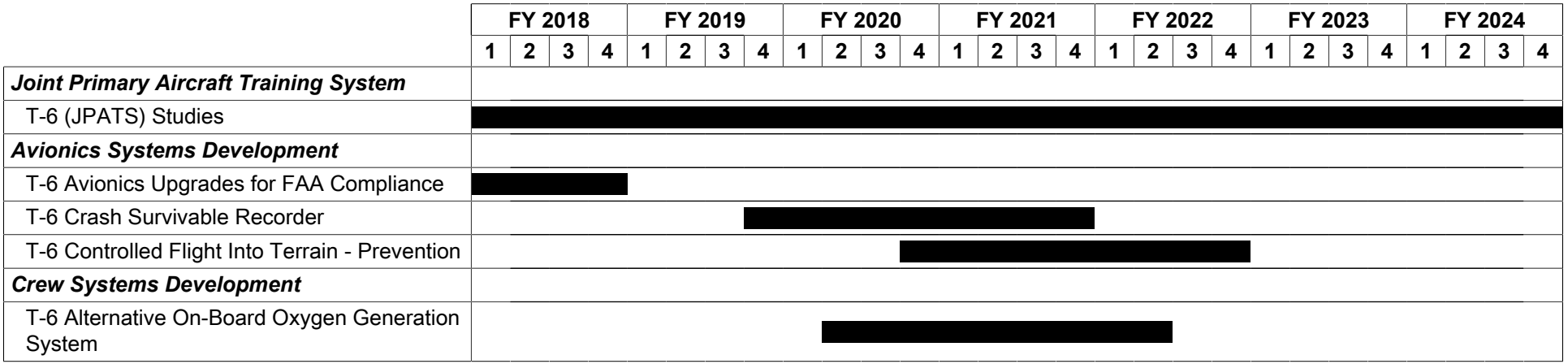

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604233F / *Specialized Undergraduate Flight Training*	**Project (Number/Name)** 676035 / *T-6 Operational System Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Joint Primary Aircraft Training System				
T-6 (JPATS) Studies	1	2018	4	2024
Avionics Systems Development				
T-6 Avionics Upgrades for FAA Compliance	1	2018	4	2018
T-6 Crash Survivable Recorder	4	2019	4	2021
T-6 Controlled Flight Into Terrain - Prevention	4	2020	4	2022
Crew Systems Development				
T-6 Alternative On-Board Oxygen Generation System	2	2020	2	2022

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force			Date: February 2019
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604233F / *Specialized Undergraduate Flight Training*	Project (Number/Name) 676037 / *T-38 Operational System Development*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
676037: *T-38 Operational System Development*	-	1.938	8.797	0.605	0.000	0.605	2.453	2.560	0.967	1.254	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The T-38 is a twin engine, two seat (tandem), supersonic jet trainer used by Air Education and Training Command as an advanced trainer in Specialized Undergraduate Pilot Training. Modifications are budgeted to enhance operational capability while improving flight safety, reliability and maintainability. There are currently 505 T-38's in the Air Force inventory (53 T-38A, 6 AT-38B and 446 T-38C) with 5 T-38Cs pending removal. T-38s first entered service in 1960 and average over 50 years old.

Studies & development efforts supporting future ACAT III Engineering Change Proposals to address obsolescence issues and the regular block upgrades are required to keep the system current. These will be accomplished with Operations & Maintenance funding unless the block upgrade provides additional capabilities. Block upgrades incorporate software and/or hardware improvements to comply with new capabilities mandated by Department of Defense, Federal Aviation Administration, or National Airspace System, and to address flight safety issues. The block upgrades support the T-38C aircraft and Aircrew Training Devices.

L3 Display Systems is unable to continue support of the T-38C Multi-Functional Display (MFD) and the Electronic Engine Display (EED) beyond March 2026. Development of replacement displays must begin in FY21 to ensure continued AETC pilot production. There are 2 MFDs and 2 EEDs per aircraft (1,768 displays). The current Program Office Estimate indicates MFD and EED development funding requirements of FY21 $10.280M and FY22 $10.160M and procurement funding requirements of: FY23 $42.999M and FY24 $45.839M. Market research is continuing.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver T-38 Operational systems Development weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F."

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: T-38 Avionics Component Integration (AvCI)	0.010	8.740	0.605	-	0.605
Description: T-38C Avionics System obsolescence remediation effort is developing and qualifying replacement components/Line Replaceable Units (LRU) that are becoming non-supportable. Systems include the Mission Display Processor (MDP), Heads-Up Display (HUD) and Very High Frequency (VHF) Communication and Navigation radios. Additionally, the T-38C program is developing a solution for the Federal Aviation Administration Automated Dependent Surveillance-Broadcast (ADS-B) (Out) mandate. Furthermore, L3 Display Systems is unable to continue support of the T-38C Multi-Functional Display (MFD) and the Electronic Engine					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604233F / *Specialized Undergraduate Flight Training*	**Project (Number/Name)** 676037 / *T-38 Operational System Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Display (EED) beyond March 2026. Development of replacement displays must begin in FY20 to ensure continued AETC pilot production beyond March of 2026. ***FY 2019 Plans:*** All T-38C programs will complete developmental testing and move in to the production and deployment phase by the 3rd quarter of FY19. This is the final funding requirements for development and testing of the HUD, MDP and VHF systems. ***FY 2020 Base Plans:*** EED and MFD development will start in the 2nd quarter of FY20. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Developmental test will be completed for the Mission Display Processor, Heads-Up Display, VHF Radios and the ADS-B program by the 2rd quarter of FY19. The FY19 developmental funding completes the funding requirements for the HUD, MDP, VHF and ADS-B efforts. The significant reduction in funding from FY19 to FY20 is due to the completion of the previous efforts and the initiation of the EED and MFD effort.					
Title: T-38 Studies and Development Efforts ***Description:*** Studies and efforts to support future ACAT III Engineering Change Proposals to address obsolescence issues and the regular block upgrades are required to keep the system current. ***FY 2019 Plans:*** FY19 will be utilized for T-38C Boresight equipment development. The T-38C is experiencing an increase in HUD support frame cracking. Additional alignment equipment is required to ensure AETC pilot training is not impacted. ***FY 2020 Base Plans:*** There are no efforts planned for FY20. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Funding reduced to zero because there are no efforts planned for FY20 in this category.	0.010	0.042	0.000	-	0.000
Title: T-38A/B ADS-B ***Description:*** Develop and integrate an Automatic Dependent Surveillance Broadcast (Out) solution the T-38A/B model fleet. The solution must maintain the military transponder modes.	1.918	0.015	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604233F / *Specialized Undergraduate Flight Training*	**Project (Number/Name)** 676037 / *T-38 Operational System Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY 2019 Plans: Development and testing will be completed by the 2nd quarter of FY19. The program will move to the production and deployment phase. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** T-38A & AT-38B ADS-B system development and integration will be completed by the 3rd quarter of FY19.					
Accomplishments/Planned Programs Subtotals	1.938	8.797	0.605	-	0.605

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• APAF 05 Line Item T03800: *T-38*	51.641	70.623	35.076	-	35.076	38.026	39.624	38.489	0.000	Continuing	Continuing

Remarks

D. Acquisition Strategy

The T-38 Operations System Development acquisition strategy for satisfying emerging software and hardware requirements is designed to enable competition and cost control. Developmental requirements resulting from Diminishing Manufacturing Sources and Material Shortages research and reporting will be evaluated and implemented incrementally to efficiently deliver required capabilities to Air Education & Training Command in support of the pilot training program. System block upgrades will be required to maintain aircraft airworthiness and will be implemented based on Air Education & Training Command requirements. An appropriate level of technical data rights is required by all current support contracts.

Contract FA8211-16-D-0001 is a Type D Indefinite Delivery, Indefinite Quantity contract competitively awarded to address T-38C avionics system obsolescence issues and provide Contractor Logistics Support follow-on support. The Avionics Component Integration contract was awarded 8 January 2016. Obsolescence remediation efforts began immediately and the follow-on Contractor Logistics Support effort began 1 April 2017.

The T-38C display obsolescence issues are within scope on the current contract with Boeing. The contract FA8211-16-D-0001 will be utilized for development and procurement.

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force			Date: February 2019
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0604233F / *Specialized Undergraduate Flight Training*	Project (Number/Name) 676037 / *T-38 Operational System Development*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
T-38 Avionics System DMSMS mitigation efforts	C/FFP	The Boeing Company : St. Louis, MO	-	0.010	Oct 2017	8.648	Oct 2018	0.555	Feb 2020	-		0.555	Continuing	Continuing	-
T-38 A/B Automatic Dependent Surveillance-Broadcast	SS/FFP	The Raytheon Company : Aberdeen, MD	-	1.632	Oct 2017	0.015	Oct 2018	-		-		-	Continuing	Continuing	-
T-38 Studies and Development Efforts	Various	TBD : NV	-	0.010	Oct 2017	0.042	Oct 2018	0.000		-		0.000	Continuing	Continuing	-
		Subtotal	-	1.652		8.705		0.555		-		0.555	Continuing	Continuing	N/A

Remarks

FY18 $72K transferred to Small Business Innovative Research funding.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Avionics system Flight Test	PO	412th FTS : Edwards AFB, CA	-	0.194	Oct 2017	-		-		-		-	Continuing	Continuing	-
Not specified.	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
		Subtotal	-	0.194		-		-		-		-	Continuing	Continuing	N/A

Remarks

Funding for flight test is estimated to cover T-38A/B/C requirements.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PMA Contract support	C/FFP	Not specified. : NV	-	0.033	Dec 2017	0.033	Dec 2018	-		-		-	Continuing	Continuing	-
Government Travel	Various	Not specified. : NV	-	0.059	Oct 2017	0.059	Oct 2017	0.050	Dec 2019	-		0.050	Continuing	Continuing	-
		Subtotal	-	0.092		0.092		0.050		-		0.050	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force			Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604233F / *Specialized Undergraduate Flight Training*	**Project (Number/Name)** 676037 / *T-38 Operational System Development*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	1.938		8.797		0.605		-		0.605	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604233F / *Specialized Undergraduate Flight Training*	**Project (Number/Name)** 676037 / *T-38 Operational System Development*

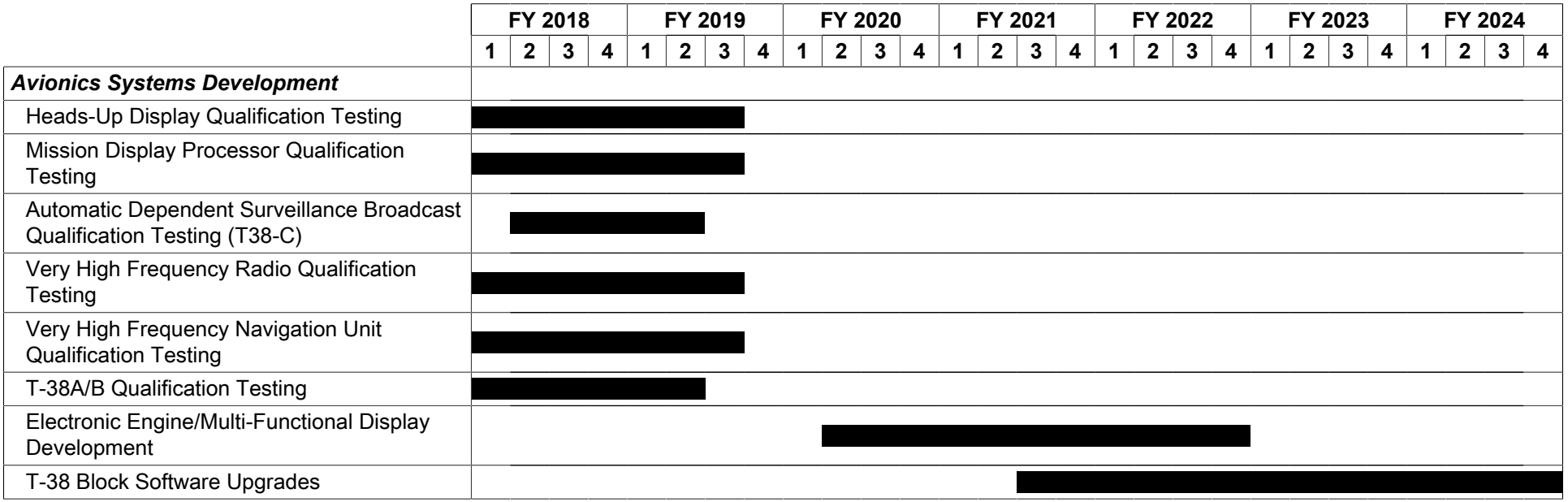

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0604233F / *Specialized Undergraduate Flight Training*	**Project (Number/Name)** 676037 / *T-38 Operational System Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Avionics Systems Development				
Heads-Up Display Qualification Testing	1	2018	3	2019
Mission Display Processor Qualification Testing	1	2018	3	2019
Automatic Dependent Surveillance Broadcast Qualification Testing (T38-C)	2	2018	2	2019
Very High Frequency Radio Qualification Testing	1	2018	3	2019
Very High Frequency Navigation Unit Qualification Testing	1	2018	3	2019
T-38A/B Qualification Testing	1	2018	2	2019
Electronic Engine/Multi-Functional Display Development	2	2020	4	2022
T-38 Block Software Upgrades	3	2021	4	2024