Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force											Date: February 2018	
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603199F / *Sustainment Science and Technology (S&T)*							
COST ($ in Millions)	**Prior Years**	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Cost To Complete**	**Total Cost**
Total Program Element	-	19.994	22.811	15.150	0.000	15.150	16.249	16.938	17.731	18.324	Continuing	Continuing
635351: *Technology Sustainment*	-	19.994	22.811	15.150	0.000	15.150	16.249	16.938	17.731	18.324	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program develops and demonstrates mature Air Force Research Laboratory (AFRL) sustainment technologies such as: materials, corrosion, maintenance/repair techniques, state awareness/non-destructive inspection, health management, life prediction, low observable materials and processes, composite materials and logistics for transition into fielded Air Force systems to reduce life cycle sustainment costs and increase readiness. Technologies matured and demonstrated impact affordability and availability of fielded aerospace weapon systems by reducing sustainment costs, extending service life, and maintaining mission readiness and capability. This program develops and demonstrates maintenance, life cycle management, and system/fleet decision making technologies that can be implemented to address operational sustainment issues and could influence future system sustainability decisions via risk reduction to support inclusion into new systems. Studies are conducted to analyze processes and methodologies for application of technologies to address sustainment issues across the force, identifying cross cutting applications for fielded systems, and opportunities for building in sustainability into future applications. This program also develops and demonstrates affordable advanced composites for aircraft structures of fielded and emerging systems. This includes studies, analysis, and tests for application of composites to address sustainment and affordability issues across the force. Efforts in this program have been coordinated through the Department of Defense (DoD) Science and Technology (S&T) 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 program funds in this PE would be in addition to the civilian pay expenses budgeted in program elements 0601102F, 0602102F, 0602201F, 0602202F, 0602203F, 0602204F, 0602601F, 0602602F, 0602605F, 0602788F, 1206601F, and 0602298F.

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

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B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	20.636	22.811	23.217	0.000	23.217
Current President's Budget	19.994	22.811	15.150	0.000	15.150
Total Adjustments	-0.642	0.000	-8.067	0.000	-8.067
• 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	-0.642	0.000			
• Other Adjustments	0.000	0.000	-8.067	0.000	-8.067

Change Summary Explanation

Decrease in FY 2019 due to realignment of composite certification work from PE 0603199F, Sustainment Science and Technology (S&T), Project 635351, Technology Sustainment, to PE 0603211F, Aerospace Technology Dev/Demo, Project 634920, Flight Vehicle Tech Integration.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: System Health Management/Assessment Technologies	4.798	5.325	5.171

Description: Develop, demonstrate, and transition state awareness/system health management technologies. Conduct studies and analyses to design sustainability into future applications. The short-term tasks in this area are selected based on warfighter needs identified via a bi-annual, competitive process.

FY 2018 Plans:

Complete demonstration of aircraft electrical systems maintenance testing capability. Continue health assessment capability development for fielded air/space/cyber systems and components. Continue development of diagnostic system to assess aircraft wiring and avionics subsystems. Continue development and demonstration of diagnostic technology to monitor/assess health of airframe/engine, launch vehicle, spacecraft, intercontinental ballistic missiles (ICBMs), and components. These efforts are in Air Force Air, Space, and Cyber mission areas. Initiate the following effort based on competitive selection in FY 2017: development of system to reduce maintenance requirements of F-35 carbon monoxide detection system.

FY 2019 Plans:

Complete development of automated software release capability to assess and maintain system health. Continue development of diagnostic system to assess aircraft wiring and avionics subsystems. Continue development of system to reduce maintenance requirements of carbon monoxide detection system. Continue health assessments capability development for fielded air/space/ cyber systems and components. Continue development and demonstration of diagnostic technology to monitor/assess health of

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
airframe/engine, launch vehicle, spacecraft, intercontinental ballistic missiles (ICBMs), and components. These efforts are in Air Force Air, Space, and Cyber mission areas. Continue development of testing systems to assess aircraft electrical subsystems. Initiate new efforts based on competitive selection processes in FY 2018. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $ 0.154 million. Justification for the decrease is described in the plans above.			
Title: Prevention/Enhanced Maintainability Technologies	4.868	5.325	5.171
Description: Develop, demonstrate, and transition maintenance and sustainment technologies to improve component design, maintenance, replacement, and concepts for performance improvement and reduced maintenance burden. The short-term tasks in this effort are selected based on warfighter needs identified via a bi-annual, competitive process. ***FY 2018 Plans:*** Complete advanced monopropellant material replacement for space propulsion systems. Complete transition of two full sized B-2 Radomes for functional ground testing and flight service evaluation. Continue Advanced Canopy Technology development. Initiate Rapid Repair Requirements materials development for aircraft battle damage repair of advanced fighter aircraft. Continue efforts to develop an adaptive maintainer training capability to improve maintainer performance, and an improved method for removal of biofilms from in ground fuel storage systems. Continue development of materials and processes to reduce maintenance burden on low observable systems. Continue efforts to demonstrate high reliability of repair and maintenance technologies to increase service time between maintenance actions. Continue to develop, demonstrate, and transition sustainment technologies to improve component design, maintenance, repair, replacement, and concepts for maintainer training, extending part life and reduced maintenance burden spanning Air Force Air, Space, and Cyber mission areas. Initiate the following effort based on competitive selection in FY 2017: development of materials and processes to reduce maintenance burden on low observable systems. ***FY 2019 Plans:*** Complete thermal spray coating process development for engine components. Complete development of an improved method for removal of biofilms from in ground fuel storage systems. Complete improved durability conductive tape and enhanced edge treatment repair development for transition to the B-2. Continue Rapid Repair Requirements materials development for aircraft battle damage repair of advanced fighter aircraftContinue Advanced Canopy Technology development. Initiate total body non-destructive evaluation system for outer mold line inspection of advanced fighter aircraft. Continue development of materials and processes to reduce maintenance burden on low observable systems. Continue efforts to demonstrate high reliability of repair and maintenance technologies to increase service time between maintenance actions. Continue to develop, demonstrate, and transition maintenance and sustainment technologies to improve component design, maintenance, repair, replacement, and			

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
concepts for maintainer training, extending part life, and reduced maintenance burden spanning Air Force Air, Space, and Cyber mission areas. Initiate new efforts based on competitive selection processes in FY 2018. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $ 0.154 million. Justification for the decrease is described in the plans above.			
Title: Management/Improved Reliability Technologies ***Description:*** Develop, demonstrate, and transition technologies to improve existing and new components, fleet management/ decision-making tools, and supply chain/sustainment infrastructure to decrease downtime and costs, and increase reliability. The short-term tasks in this effort are selected based on warfighter needs identified via a bi-annual, competitive process. ***FY 2018 Plans:*** Complete corrosion data management and prediction tool demonstration and development of replacement honeycomb structures for C-5. Continue data mining software development to determine asset availability. Continue effort to assess and accurately determine B-2 exhaust liner thermal profile and structural environment, and demonstrate performance of exhaust structures coatings. Continue software development to increase speed and accuracy of solid rocket motor inspections to reduce sustainment costs and improve reliability. Continue efforts to develop system fleet management decision-making tools, maintenance/repair data base technologies and techniques, and supply chain/infrastructure approaches to reduce sustainment costs. These efforts span Air Force Air, Space, and Cyber mission areas. Initiate the following effort based on competitive selection in FY 2017: analysis techniques to extend engine component service life. ***FY 2019 Plans:*** Complete data mining software development to determine asset availability. Continue effort to assess and accurately determine B-2 exhaust liner thermal profile and structural environment, and demonstrate performance of exhaust structures coatings. Continue software development to increase speed and accuracy of solid rocket motor inspections to reduce sustainment costs and improve reliability. Continue development of analysis techniques to extend engine component service life. Continue efforts to develop system fleet management decision-making tools, maintenance/repair data base technologies and techniques, and supply chain/infrastructure approaches to reduce sustainment costs. These efforts span Air Force Air, Space, and Cyber mission areas. Initiate new efforts based on competitive selection processes in FY 2018. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $ 0.120 million. Justification for the decrease is described in the plans above.	4.504	4.144	4.024
Title: Composite Certification	5.824	8.017	0.784

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Description: Develop, demonstrate and transition reliability-based design of advanced composites for aircraft structures. This includes studies and analysis of processes and methodologies for application of composites to address sustainment and affordability issues across the force. ***FY 2018 Plans:*** Complete demonstration of manufacturing processes and manufacturing process control of composite primary structures. Complete demonstration of the feasibility and benefits of a robust process for predicting and addressing the risk elements for safe and affordable certification of composite structures. Complete demonstration of life extension of a composite primary structure beyond that of the original certified service life. Initiate a service life extension demonstration on a legacy fleet aircraft composite part. ***FY 2019 Plans:*** Continue service life extension demonstration on a legacy fleet aircraft composite part. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $7.233 million. Justification for this decrease is due to realignment of composite certification work from Program Element 0603199F to Program Element 0603211F, Project 634920, Advanced Aerospace Structures Technologies effort.			
Accomplishments/Planned Programs Subtotals	19.994	22.811	15.150

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

N/A

F. 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.