Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Air Force											Date: March 2014	
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 2013**	**FY 2014**	**FY 2015 Base**	**FY 2015 OCO #**	**FY 2015 Total**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**Cost To Complete**	**Total Cost**
Total Program Element	-	5.833	12.800	15.800	-	15.800	18.500	20.800	23.000	23.414	Continuing	Continuing
635351: *Technology Sustainment*	-	5.833	12.800	15.800	-	15.800	18.500	20.800	23.000	23.414	Continuing	Continuing

The FY 2015 OCO Request will be submitted at a later date.

A. Mission Description and Budget Item Justification

This project 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, composite certification 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 project 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. 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 is in Budget Activity 3, Advanced Technology Development, since it develops, demonstrates and transitions technologies for sustaining aerospace systems that have military utility and address warfighter needs.

B. Program Change Summary ($ in Millions)	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total
Previous President's Budget	6.565	12.800	15.800	-	15.800
Current President's Budget	5.833	12.800	15.800	-	15.800
Total Adjustments	-0.732	-	-	-	-
• Congressional General Reductions	-0.009	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.171	-			
• Other Adjustments	-0.552	-	-	-	-

C. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: System Health Management/Assessment Technologies	1.797	4.425	4.862

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Description: Develop, demonstrate, and transition state awareness/system health management technologies. Conduct studies and analyses to design sustainability into future applications. ***FY 2013 Accomplishments:*** Verified state-of-the-art algorithms and techniques to assess health and real-time awareness for weapon system components. Continue to develop life prediction models for extending component life, and to demonstrate and incorporate health assessment technologies into sustainment operations. Completed validation of eddy current non-destructive inspection (NDI) techniques for KC-135 wing inspection, also applicable to multiple aircraft depot level inspections, which will improve crack detection in multiple layers of material. Initiated efforts to monitor/assess health of airframe/engine, wiring insulation and oil. ***FY 2014 Plans:*** Continue efforts to demonstrate and validate algorithms and techniques for system assessment and health management. Continue health assessment capability development for fielded systems and components. Continue development and demonstration of diagnostic technology to monitor/assess health of airframe/engine and components. Initiate and complete active fuel bladder leak detection capability. Initiate cold work holes analysis to reduce inspections. Complete efforts to detect cracks beneath flush head fasteners and life prediction of wiring insulation. ***FY 2015 Plans:*** Continue development and demonstration of diagnostic technology to monitor/assess health of airframe/engine and components. Continue development of active fuel bladder leak detection capability and health assessment capability development for fielded systems and components. Complete quantification of life extension prediction of A-10 and T-38 aircraft cold worked holes.			
Title: Prevention/Enhanced Maintainability Technologies ***Description:*** Develop, demonstrate, and transition technologies to improve component design, maintenance, replacement, and concepts for performance improvement and reduced maintenance burden. ***FY 2013 Accomplishments:*** Continued efforts to develop life enhancement/replacement/repair technologies and demonstrate high reliability solutions. Initiate efforts to develop honeycomb replacement alternatives for the C-5 and a two-fold increase in Mean Time Between Failure (MTBF) for the MQ-1 Predator sensor cryo-coolers. Continued residual stress surface treatment approach, enabling a three-fold extension of the A-10 aircraft wing splice life. Continued design, validation and manufacture of aluminum hybrid alternative for A-10 longeron strap replacement to support airframe service life extension. Continued development and demonstration of engine component technologies to enable conversion of MQ-1 Predator engines from aviation gasoline (AVGAS) to Jet Propellant	2.245	5.340	5.592

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
8 (JP-8). Initiated efforts to develop and demonstrate a life enhancement/repair capability for B-1 access panels and coating thickness measurement technology for the B-2. ***FY 2014 Plans:*** Continue efforts to demonstrate high reliability repair and maintenance technologies to increase service time between maintenance actions. Continue maturation of airframe/engine/subsystem technologies including replacement for honeycomb structures, and validation of erosion coating test protocol for improved component durability, reliability, and safety to increase time between maintenance actions and reduce maintenance cost drivers. Initiate development of friction plug welding for a B-1B panel repair, of repair technologies for airfoils and of a solid state amplifier replacement for unsupportable vacuum tubes used on the B-1 aircraft's ALQ-161, defensive avionics system. Complete: Demonstration of conversion of MQ-1 Predator engines from AVGAS to JP-8; ability to reduce icing inhibitor additive to JP-8 without impacting fuel performance; and residual stress surface treatment to extend life of new and repaired A-10 wing splices. ***FY 2015 Plans:*** Continue efforts to demonstrate high reliability of repair and maintenance technologies to increase service time between maintenance actions, including a solid state amplifier replacement for unsupportable vacuum tubes used on the B-1 aircraft's ALQ-161, defensive avionics system. Complete airframe/engine/subsystem technology efforts including replacement for honeycomb structures, demonstration of a two-fold increase in MQ-1 Predator sensor cryocoolers, and validation of erosion coating test protocol for improved component durability, reliability, and safety to increase time between maintenance actions and reduce maintenance cost drivers.			
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. ***FY 2013 Accomplishments:*** Continued to evaluate technological means to adjust system management and operational sustainment requirements. Initiated effort to demonstrate probabilistic approach to engine component life management to eliminate some inspection requirements or increase inspection intervals, reducing engine overhaul costs. Initiate effort to reduce Fuel System Icing Inhibitor levels in JP-8, reducing costs of additive and maintenance due to fuel tank coat peeling in the B-52 aircraft. Completed validation of F-15C/D Stick-to-Stress Real-Time Simulator Tool to provide for more accurate & rapid analysis tool to manage unexpected new cracking locations. ***FY 2014 Plans:*** Continue efforts to develop system fleet management decision-making tools, repair data base technologies and techniques, and supply chain/infrastructure approaches to reduce sustainment costs. Develop and validate a corrosion severity/time model	1.791	3.035	2.846

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
for hot spots on the C-5 to improve anticipation and management of corrosion damage. Initiate visualizing structural data tool development to assess fleet health and fault detection/arc mitigation for the F-22. Complete effort to reduce icing inhibitor levels in JP-8. ***FY 2015 Plans:*** Continue efforts to develop system fleet management decision-making tools, repair data base technologies and techniques, and supply chain/infrastructure approaches to reduce sustainment costs. Continue efforts to develop and demonstrate a probabilistic approach to determine fatigue life limits of engine components to revise inspection and replacement intervals to reduce sustainment costs. Install a single depot level software architecture for engine part actuarial processes. Develop and validate a corrosion severity/time model for hot spots on the C-5 to improve anticipation and management of corrosion damage.			
Title: Composite Certification ***Description:*** Develop, demonstrate and transition reliability-based design of advanced composites for aircraft structures. ***FY 2013 Accomplishments:*** N/A ***FY 2014 Plans:*** N/A ***FY 2015 Plans:*** Demonstrate accurate prediction of the probability of failure and life of bonded and unitized composite structures. Demonstrate manufacturing processes and manufacturing process control of composite primary structures. Demonstrate feasibility of implementing a damage tolerant design approach for composite structures. Demonstrate feasibility and benefits of a robust process for predicting and addressing the risk elements for safe and affordable certification of composite structures. Demonstrate life extension of a composite primary structure beyond that of the original certified service life.	-	-	2.500
Accomplishments/Planned Programs Subtotals	5.833	12.800	15.800

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

Not Applicable.

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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.