Exhibit R-2, PB 2010 Air Force RDT&E Budget Item Justification									DATE: May 2009	
APPROPRIATION/BUDGET ACTIVITY 3600 - Research, Development, Test & Evaluation, Air Force/BA 3 - Advanced Technology Development (ATD)					R-1 ITEM NOMENCLATURE PE 0603211F Aerospace Technology Dev/Demo					
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	70.352	45.990	76.844						Continuing	Continuing
63486U: Advanced Aerospace Structures	2.320	1.197	0.000						Continuing	Continuing
634920: Flight Vehicle Tech Integration	68.032	44.793	76.844						Continuing	Continuing

A. Mission Description and Budget Item Justification

This program demonstrates advanced aerospace vehicle technologies. Advanced aerospace structures are demonstrated to sustain and enhance the capability of current and future aerospace vehicles. Aerospace vehicle technology integration is accomplished through integration of various technologies to include avionics, advanced propulsion, and weapons systems for demonstration in near-realistic operational environments.

This program is in Budget Activity 3, Advanced Technology Development, since it develops and demonstrates technologies for existing aerospace vehicle system upgrades and/or new system developments that have military utility and address warfighter needs.

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	66.884	44.918	83.204	
Current BES/President's Budget	70.352	45.990	76.844	
Total Adjustments	3.468	1.072	0.000	
Congressional Program Reductions	0.000	-0.003		
Congressional Rescissions	0.000	-0.125		
Total Congressional Increases	0.000	1.200		
Total Reprogrammings	5.252	0.000		
SBIR/STTR Transfer	-1.784	0.000		

Change Summary Explanation

Note 1: In FY 2008, $0.276 million was added for the Global War on Terrorism and this funding is being re-programmed to PE 0603231F - Crew Systems and Personnel Protection Technology for execution. Note 2: In FY 2009, Congress added $1.2 million for Big Antennas Small Structures Efficient Tactical (BASSET) unmanned air vehicle.

Exhibit R-2, PB 2010 Air Force RDT&E Budget Item Justification	DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 3600 - Research, Development, Test & Evaluation, Air Force/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603211F Aerospace Technology Dev/Demo

(U) C. Performance Metrics
Under Development

Exhibit R-2a, PB 2010 Air Force RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 3600 - Research, Development, Test & Evaluation, Air Force/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603211F Aerospace Technology Dev/Demo					PROJECT NUMBER 63486U	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
63486U: Advanced Aerospace Structures	2.320	1.197	0.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

This project develops and demonstrates affordable aerospace vehicle technologies to sustain the existing fleet, reduce the cost of aircraft ownership, and enhance the capability of current and future aerospace vehicles. Sustainment of the existing fleet through extended operational service life with innovative technology application will lead to reduced operations and support costs, and increased operational readiness. Analytical certification will reduce the cost associated with component replacement by allowing and certifying new designs under reduced test requirements. Development of capability enhancing technologies will expand the operational envelope and increase survivability in high threat environments. Demonstration of these technologies will restore structural integrity, extend structural life, enhance the capability, and reduce the life cycle costs of fielded aircraft.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
CONGRESSIONAL ADD: Advanced Aerospace Titanium Structures (AATS) Initiative. In FY 2008: Conducted Congressionally-directed AATS effort. In FY 2009: Not Applicable. In FY 2010: Not Applicable.	1.546	0.000	0.000	
CONGRESSIONAL ADD: Big Antennas Small Structures Efficient Tactical (BASSET) Unmanned Airl Vehicles. In FY 2008: Conducted Congressionally-directed effort for big antennas small structures efficient tactical unmanned air vehicles. In FY 2009: Conduct Congressionally-directed effort for big antennas small structures efficient tactical unmanned air vehicles.	0.774	1.197	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY 2010: Not Applicable.				

C. Other Program Funding Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
Activity Not Provided/ Related Activities:	0.000	0.000							Continuing	Continuing
Activity Not Provided/ This project has been coordinated through the Reliance process to harmonize efforts and eliminate du	0.000	0.000							Continuing	Continuing

D. Acquisition Strategy

Not Applicable.

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-2a, PB 2010 Air Force RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 3600 - Research, Development, Test & Evaluation, Air Force/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603211F Aerospace Technology Dev/Demo					PROJECT NUMBER 634920	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
634920: Flight Vehicle Tech Integration	68.032	44.793	76.844						Continuing	Continuing

Note

Note: In FY 2008, $0.276 million was added for the Global War on Terrorism. This funding is being re-programed to PE 0603231F - Crew Systems and Personnel Protection Technology for execution. Increased funding in FY 2010 is due to FY 2008 emphasis being placed on flight demonstration efforts of an X-type composite cargo aircraft.

A. Mission Description and Budget Item Justification

This project integrates and demonstrates advanced flight vehicle technologies that will improve the performance and supportability of existing and future manned and unmanned aerospace vehicles. System level integration brings together the aerospace vehicle technologies along with avionics, propulsion, and weapon systems for demonstration in a near-realistic operational environment. Integration and technology demonstrations reduce the risk and time required to transition technologies into operational aircraft. This program provides proven aerospace vehicle technologies for all-weather, day/night operations with improved performance and affordability.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
MAJOR THRUST: Develop autonomous flight controls for safe flight and cooperative operations between manned and unmanned air platforms. Note: Increased funding FY 2010 is due to increased emphasis being placed on improving the control of unmanned platforms. In FY 2008: Further developed situational awareness and control technologies for automated air base ground operations for unmanned air vehicles. Initiated electromagnetic threat tolerant control systems technologies for air base ground operations for unmanned air vehicles. In FY 2009: Conduct ground demonstrations of situational awareness and control technologies for unmanned air vehicles operating in and around air bases. Develop and demonstrate cooperative teaming of small unmanned air vehicles in complex, low altitude environments. Conduct evaluation of validation and verification tools and process for affordable certification of autonomous unmanned air vehicle flight control software.	6.299	6.485	8.573	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY 2010: Further the development and demonstration of situational awareness, autonomous control, and survivability technologies for manned and unmanned air vehicles. Continue development and demonstration of cooperative teaming of small unmanned air vehicles in complex, low altitude environments. Continue development of autonomous launch, recovery, and safe airspace interoperability technologies for unmanned systems. Extend adaptive guidance, navigation, and control technology for use in reusable launch systems.				
MAJOR THRUST/CONGRESSIONAL ADD: Develop, simulate, and demonstrate integrated technologies to improve the performance of manned and unmanned platforms. Note: In FY 2008, fabrication of X-type cargo aircraft was completed. Increased funding in FY 2010 is due to increased emphasis being placed on flight demonstration efforts of an X-type cargo aircraft. In FY 2008: Conducted flight demonstration of extensive laminar flow on swept wing test article. Completed wind tunnel testing of gust load alleviation and body freedom flutter suppression of high altitude, long endurance platforms. Completed integration of data streams and analysis tools; graphical user interfaces; database/model updates; validation of model and selection criteria; and identification of model correction factors. Developed and integrated aircraft components that capitalize upon unitized advanced materials that are lightweight and affordable into an X-type cargo aircraft. Developed approaches that would reduce the tooling required to fabricate aircraft components. Began flight demonstration efforts for an X-type cargo aircraft. In FY 2009: Complete flight demonstration of extensive laminar flow on swept wing test article. Conduct and complete flight demonstration of an X-type aircraft comprised of advanced materials for weight reduction, surface smoothness, corrosion, and fatigue elimination. Continue development of a simulation environment to enable evaluation of network centric technologies for improved capabilities for high speed operational concepts. In FY 2010: Continue work to develop and demonstrate flow control for reducing acoustic loading and enhancing weapon separation from future strike platforms. Continue development of a simulation environment	44.405	17.014	32.308	

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B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
to enable evaluation of network centric technologies for improved capabilities for high speed operational concepts. Conduct flight demonstration efforts of an X-type cargo aircraft with all composite wings.					
MAJOR THRUST: Develop aircraft structures that have embedded components, which have previously been separate components that were attached to the air platforms. Note: Increased funding in FY 2010 is due to increased emphasis being placed on demonstration efforts related to integrated airframe components. In FY 2008: Conducted structural demonstration of low band antenna structure. Assessed and refined development of multi-functional integrated structures to reduce cost, and weight, while improving performance of future air platforms. Completed fabrication and flight test a large X-band electronically-scanned antenna array embedded in a load-bearing structure. In FY 2009: Complete and assess test results from the flight demonstration of the large X-band electronically scanned antenna array embedded in a load-bearing structure. In FY 2010: Complete assessment of test results from the flight demonstration of the large X-band electronically scanned antenna array embedded in a load-bearing structure. Demonstrate and assess results of ultra lightweight multi-functional airframes. Demonstrate key high altitude persistent Intelligence, Surveillance, and Reconnaissance technologies.		14.003	13.160	15.467	
MAJOR THRUST: Develop adaptive structures to provide in-flight modifications offering improved performance over a wide range of flight conditions and mission profiles. Note: Increased funding in FY 2010 is due to increased emphasis being placed on demonstration efforts related to integrated airframe components for high speed vehicle applications. In FY 2008: Developed passive and active leading edge cooling systems for ultra, high-speed vehicles. Developed and validated integration methodologies for component level leading edge test articles. Completed		3.325	8.134	16.264	

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B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
development and demonstration of highly efficient wing concepts integrating active aero elastic design concepts. In FY 2009: Demonstrate passive and active thermal protection systems for leading edge of high-speed vehicle components. Assess results from demonstrations of advanced efficient wings concepts integrating active aeroelastic design concepts and adaptive structures. In FY 2010: Demonstrate passive and active thermal protection systems for leading edge of high-speed vehicle components. Continue assessment of results from demonstrations of advanced efficient wings concepts integrating active aeroelastic design concepts and adaptive structures. Demonstrate and assess rapid operability, maintainability, and support capabilities of conceptual reusable hypersonic vehicles. Demonstrate and assess integrated structural health management for load bearing composite tanks and wing structures. Demonstrate the characterization of high energy laser concepts for flight class, weight, and performance.					
MAJOR THRUST: Develop, simulate, and demonstrate integrated aeromechanics, structures and controls technologies to enable, and improve the performance of high-speed and hypersonic manned and unmanned air vehicles. Note: In FY 2010 increased emphasis is being placed on technology development/demonstration efforts relevant to unpowered hypersonic boost-glide vehicles. In FY 2008: Not Applicable. In FY 2009: Not Applicable. In FY 2010: Initiate work to develop and demonstrate hypersonic ablation /shape-change measurement and prediction capabilities for carbon/carbon materials and low-temperature material analogues and apply these methods to understand shape change for upcoming high-speed tests and other current prompt global reach concepts under development. Initiate risk reduction research in the areas of aeromechanics, propulsion integration, controls, and hot structures for the high-speed combined-cycle propulsion demonstration program.		0.000	0.000	4.232	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011

C. Other Program Funding Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
Activity Not Provided/ Related Activities:	0.000	0.000							Continuing	Continuing
PE 0602201F/ Aerospace Vehicle Technologies.	0.000	0.000							Continuing	Continuing
PE 0604015F/ Next Generation Bomber.	0.000	0.000							Continuing	Continuing
Activity Not Provided/ This project has been coordinated through the Reliance process to harmonize efforts and eliminate du	0.000	0.000							Continuing	Continuing

D. Acquisition Strategy

Not Applicable.

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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