Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Air Force											Date: February 2015	
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603211F / *Aerospace Technology Dev/Demo*							
COST ($ in Millions)	**Prior Years**	**FY 2014**	**FY 2015**	**FY 2016 Base**	**FY 2016 OCO**	**FY 2016 Total**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**Cost To Complete**	**Total Cost**
Total Program Element	-	75.029	91.037	100.733	-	100.733	63.866	76.800	83.557	77.271	Continuing	Continuing
634920: *Flight Vehicle Tech Integration*	-	75.029	5.663	25.779	-	25.779	17.289	21.234	26.118	29.658	Continuing	Continuing
634926: *High Speed/Hypersonic Intgr and Demo*	-	-	66.999	50.700	-	50.700	32.301	38.782	37.884	21.328	Continuing	Continuing
634927: *Flight Systems Control*	-	-	18.375	24.254	-	24.254	14.276	16.784	19.555	26.285	Continuing	Continuing

A. Mission Description and Budget Item Justification

These projects support Department of Defense (DoD) priorities for demonstrations in hypersonics and unmanned systems, respectively. This program integrates and demonstrates advanced flight vehicle technologies that improve the performance and supportability of existing and future aerospace vehicles. System level integration brings together 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. In FY 2015, this program has two new projects, High Speed/Hypersonic Integration and Demonstration and Flight Systems Control. Efforts in this program have been coordinated through the Department of Defense (DoD) Science and Technology (S&T) Executive Committee process to harmonize efforts and eliminate duplication. 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.

B. Program Change Summary ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	77.329	91.062	99.103	-	99.103
Current President's Budget	75.029	91.037	100.733	-	100.733
Total Adjustments	-2.300	-0.025	1.630	-	1.630
• Congressional General Reductions	-	-0.025			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.300	-			
• Other Adjustments	-	-	1.630	-	1.630

Change Summary Explanation

Increase in FY 2016 due to higher DoD priorities.

Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force			Date: February 2015
Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603211F / *Aerospace Technology Dev/ Demo*	Project (Number/Name) 634920 / *Flight Vehicle Tech Integration*	

COST ($ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
634920: *Flight Vehicle Tech Integration*	-	75.029	5.663	25.779	-	25.779	17.289	21.234	26.118	29.658	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project demonstrates advanced aerospace vehicle technologies. Aerospace Vehicle Technology Integration efforts are accomplished through integration of various technologies to include avionics, advanced propulsion, and weapon systems for demonstration in near-realistic operational environments. Advanced Aerospace Structures Technologies are demonstrated to enhance the capability of current and future aerospace vehicles.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Title: Flight Systems Controls ***Description:*** Integrates and demonstrates advanced control technologies that improve the performance, reliability, safety, and survivability of manned and unmanned aerospace systems. Enhanced capabilities are enabled by control, automation, and system level integration of subsystems and systems such as propulsion, airframes, avionics, power, weapons, communications, and operator interfaces. Modeling and simulation, integration, and technology demonstrations in a near-operational environment reduce the risk and time required to transition technologies into existing and future aerospace systems. ***FY 2014 Accomplishments:*** Continued to develop and demonstrate technologies for situational awareness, autonomous control, and survivability for unmanned systems and manned platforms. Demonstrated airborne control of small unmanned platforms in complex, low altitude environments. Continued demonstration of autonomous and safe airspace interoperability for manned and remotely piloted aircraft systems. ***FY 2015 Plans:*** Starting in FY 2015, efforts and funding in this area will be transferred to new project 634927, Flight Systems Control to better align efforts. ***FY 2016 Base Plans:*** N/A	3.556	-	-	-	-
Title: Aerospace Vehicle Technology Integration ***Description:*** Develop, simulate, and demonstrate integrated technologies to improve the performance of aerospace platform capabilities.	20.952	1.607	11.245	-	11.245

Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force		Date: February 2015
Appropriation/Budget Activity 3600 / 3	**R-1 Program Element (Number/Name)** PE 0603211F / *Aerospace Technology Dev/ Demo*	**Project (Number/Name)** 634920 / *Flight Vehicle Tech Integration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
FY 2014 Accomplishments: Furthered efforts for precision air delivery capability for legacy mobility aircraft by reducing tracking errors and better integration of airdrop technologies. Furthered development of advanced engine system design integration to mature adaptive turbine engine technologies for advanced air vehicles along with thrust augmentors and exhaust systems to provide technical options for highly fuel-efficient engines. Completed demonstration of large cargo aircraft in formation flight for fuel burn reduction to support transition decision. Completed flight safety validation and operational compatibility of C-130 aircraft with aft body drag reduction devices. ***FY 2015 Plans:*** Initiate C-17 formation flight Advanced Technology Demonstration. Initiate feasibility flight test of C-17 aircraft with aft body drag reduction devices. Continue development of advanced engine system design integration to mature adaptive turbine engine technologies for advanced air vehicles along with thrust augmentors and exhaust systems to provide technical options for highly fuel-efficient engines. ***FY 2016 Base Plans:*** Further development of the C-17 formation flight Advanced Technology Demonstration. Complete feasibility flight test of C-17 aircraft with aft body drag reduction devices. Complete development of advanced engine system design integration to mature adaptive turbine engine technologies for advanced air vehicles along with thrust augmentors and exhaust systems to provide technical options for highly fuel-efficient engines.					
Title: Advanced Aerospace Structure Technologies ***Description:*** This title changed from Multi-Role Structure Technologies to Advanced Aerospace Structure Technologies to better reflect the content and objectives. Develop and demonstrate affordable, lightweight, adaptive, and multifunctional structural concepts integrated into aerospace systems. ***FY 2014 Accomplishments:*** Continued flight test of directional finding communication antenna integration technology demonstration into load-bearing structures for small remotely piloted aircraft (RPA). Continued flight technology demonstrations of key high altitude persistent ISR for active flutter suppression, gust load alleviation, and adaptive, multi-purpose wing surfaces. ***FY 2015 Plans:***	8.615	4.056	14.534	-	14.534

Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force		Date: February 2015
Appropriation/Budget Activity 3600 / 3	**R-1 Program Element (Number/Name)** PE 0603211F / *Aerospace Technology Dev/ Demo*	**Project (Number/Name)** 634920 / *Flight Vehicle Tech Integration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Complete flight test of directional finding communication antenna integration technology demonstration into load-bearing structures for small RPA. Complete flight technology demonstrations of key high altitude persistent ISR for active flutter suppression, gust load alleviation, and adaptive, multi-purpose wing surfaces. ***FY 2016 Base Plans:*** Initiate an electronic warfare and passive radar flight demonstration of an integrated antenna into load-bearing structures for small remotely piloted aircraft. Initiate an ultra-low cost airframe design and manufacturing demonstration.					
Title: High Speed/Hypersonic Vehicle Technologies ***Description:*** Develops, integrates and demonstrates, via simulations, ground, and flight tests, advanced flight vehicle technologies that improve the performance and supportability of future high speed/hypersonic vehicles. System level integration brings together air vehicle technologies along with avionics, propulsion, and warheads and other aerospace subsystems for demonstration in a near-realistic operational environment. Integration and technology demonstrations reduce the risk and time required to transition technologies into operational systems. This major thrust will move to Project 634926, High Speed/Hypersonic Integration and Demostration, in FY 2015. ***FY 2014 Accomplishments:*** Began accelerated development and demonstration of tactically-relevant long range high speed strike technologies including ground and flight demonstrations needed for potential follow-on acquisition program. Effort builds upon successful scramjet engine demonstration under the X-51A program. Increase in FY14 also supported high speed/hypersonics testing support and advancement of high temperature materials and structures for hypersonic vehicles. ***FY 2015 Plans:*** Efforts and funding in this area will be transferred to new Project 634926, High Speed/Hypersonic Integration and Demonstration, in FY 2015 to consoidate efforts. ***FY 2016 Base Plans:*** N/A	41.906	-	-	-	-
Accomplishments/Planned Programs Subtotals	75.029	5.663	25.779	-	25.779

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force		Date: February 2015
Appropriation/Budget Activity 3600 / 3	**R-1 Program Element (Number/Name)** PE 0603211F / *Aerospace Technology Dev/ Demo*	**Project (Number/Name)** 634920 / *Flight Vehicle Tech Integration*

C. Other Program Funding Summary ($ in Millions)

Remarks

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, RDT&E Project Justification: PB 2016 Air Force			Date: February 2015
Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603211F / *Aerospace Technology Dev/ Demo*	Project (Number/Name) 634926 / *High Speed/Hypersonic Intgr and Demo*	

COST ($ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
634926: *High Speed/Hypersonic Intgr and Demo*	-	-	66.999	50.700	-	50.700	32.301	38.782	37.884	21.328	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project develops, integrates and demonstrates, via simulations, ground, and flight tests, advanced flight vehicle technologies that improve the performance and supportability of future high speed/hypersonic vehicles. System level integration brings together air vehicle technologies along with avionics, propulsion, and warheads and other aerospace subsystems for demonstration in a near-realistic operational environment. Integration and technology demonstrations reduce the risk and time required to transition technologies into operational systems.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Title: High Speed/Hypersonic Vehicle Technologies	-	66.999	50.700	-	50.700
Description: Develop, simulate, and demonstrate integrated vehicle technologies to enable and improve the performance of future high-speed and hypersonic systems. ***FY 2014 Accomplishments:*** N/A ***FY 2015 Plans:*** Complete preliminary design review of air-breathing weapon concept vehicle. Continue accelerated development and demonstration of tactically-relevant long-range high-speed strike technologies including ground and flight demonstrations needed for potential follow-on acquisition program. Continue advancement of high temperature materials and structures for hypersonic vehicles. ***FY 2016 Base Plans:*** Continue accelerated development and demonstration of tactically-relevant long-range high-speed strike technologies including ground and flight demonstrations needed for potential follow-on acquisition program. Continue advancement of high temperature materials and structures for hypersonic vehicles. Complete preliminary design review of boost-glide weapon concept vehicle. Initiate detailed design of air-breathing weapon concept.					
Accomplishments/Planned Programs Subtotals	-	66.999	50.700	-	50.700

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force		Date: February 2015
Appropriation/Budget Activity 3600 / 3	**R-1 Program Element (Number/Name)** PE 0603211F / *Aerospace Technology Dev/ Demo*	**Project (Number/Name)** 634926 / *High Speed/Hypersonic Intgr and Demo*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A

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, RDT&E Project Justification: PB 2016 Air Force			Date: February 2015
Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603211F / *Aerospace Technology Dev/ Demo*	Project (Number/Name) 634927 / *Flight Systems Control*	

COST ($ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
634927: *Flight Systems Control*	-	-	18.375	24.254	-	24.254	14.276	16.784	19.555	26.285	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program integrates and demonstrates advanced control technologies that improve the performance, reliability, safety, and survivability of existing and future, manned and unmanned, aerospace systems. Enhanced capabilities are enabled by control, automation, and system level integration of subsystems and systems such as propulsion, airframes, avionics, power, weapons, communications, and operator interfaces. Modeling and simulation, integration, and technology demonstrations in a near-operational environment reduce the risk and time required to transition technologies into existing and future aerospace systems.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Title: Autonomous Systems Control	-	18.375	24.254	-	24.254
Description: Develop, simulate, and demonstrate advanced automation and control-enabled capabilities for manned or unmanned aerospace platforms. Develop, simulate, and demonstrate autonomous flight controls for safe flight and cooperative operations between manned and remotely piloted air platforms. ***FY 2014 Accomplishments:*** N/A ***FY 2015 Plans:*** Further development and demonstration of technologies for situational awareness, autonomous control, and survivability for unmanned systems and manned platforms. Continue demonstration of autonomous and safe airspace interoperability for manned and remotely piloted aircraft systems. Continue development and demonstration of airborne control of teams of unmanned aircraft. Continue development and demonstration of improved accuracy, situational awareness, and safety for air drop operations. Complete development and demonstration of safety of flight of analog flight control system hosting of digital flight control algorithms. Initiate demonstration of integrated ground & air collision avoidance. Initiate development and demonstration of robust, adaptive guidance, and control of hypersonic aircraft. ***FY 2016 Base Plans:*** Further development and demonstration of technologies for situational awareness, autonomous control, and survivability for unmanned systems and manned platforms. Continue demonstration of autonomous and safe airspace interoperability for manned and remotely piloted aircraft systems. Continue development and					

Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force		Date: February 2015
Appropriation/Budget Activity 3600 / 3	**R-1 Program Element (Number/Name)** PE 0603211F / *Aerospace Technology Dev/ Demo*	**Project (Number/Name)** 634927 / *Flight Systems Control*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
demonstration of airborne control of teams of unmanned aircraft. Complete development and demonstration of improved accuracy, situational awareness, and safety for air drop operations. ***FY 2016 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	-	18.375	24.254	-	24.254

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

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.