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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2011 Defense Advanced Research Projects Agency **DATE:** February 2010

<b>APPROPRIATION/BUDGET ACTIVITY</b>			<b>R-1 ITEM NOMENCLATURE</b>								
0400: <i>Research, Development, Test &amp; Evaluation, Defense-Wide</i>			PE 0603286E: <i>ADVANCED AEROSPACE SYSTEMS</i>								
BA 3: <i>Advanced Technology Development (ATD)</i>											
<b>COST (\$ in Millions)</b>	<b>FY 2009 Actual</b>	<b>FY 2010 Estimate</b>	<b>FY 2011 Base Estimate</b>	<b>FY 2011 OCO Estimate</b>	<b>FY 2011 Total Estimate</b>	<b>FY 2012 Estimate</b>	<b>FY 2013 Estimate</b>	<b>FY 2014 Estimate</b>	<b>FY 2015 Estimate</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
Total Program Element	38.252	258.278	303.078	0.000	303.078	189.075	239.659	310.420	315.352	Continuing	Continuing
AIR-01: <i>ADVANCED AEROSPACE SYSTEMS</i>	38.252	258.278	303.078	0.000	303.078	189.075	239.659	310.420	315.352	Continuing	Continuing

**A. Mission Description and Budget Item Justification**

(U) The Advanced Aerospace Systems program element is budgeted in the Advanced Technology Budget Activity because it addresses high pay-off opportunities to dramatically reduce costs associated with advanced aeronautical systems and provide revolutionary new system capabilities for satisfying current and projected military mission requirements. Research and development of integrated system concepts, as well as enabling vehicle subsystems will be conducted. Studies conducted under this project include examination and evaluation of emerging aerospace threats, technologies, concepts, and applications for missiles, munitions, and vehicle systems.

**B. Program Change Summary (\$ in Millions)**

	<u><b>FY 2009</b></u>	<u><b>FY 2010</b></u>	<u><b>FY 2011 Base</b></u>	<u><b>FY 2011 OCO</b></u>	<u><b>FY 2011 Total</b></u>
Previous President's Budget	87.619	338.360	0.000	0.000	0.000
Current President's Budget	38.252	258.278	303.078	0.000	303.078
Total Adjustments	-49.367	-80.082	303.078	0.000	303.078
• Congressional General Reductions		-1.082			
• Congressional Directed Reductions		-79.000			
• Congressional Rescissions	-23.825	0.000			
• Congressional Adds		0.000			
• Congressional Directed Transfers		0.000			
• Reprogrammings	-23.080	0.000			
• SBIR/STTR Transfer	-2.462	0.000			
• TotalOtherAdjustments	0.000	0.000	303.078	0.000	303.078

**Change Summary Explanation**

FY 2009

Decrease reflects Omnibus Reprogramming action for the H1N1 vaccine development, Section 8042 rescission of the FY 2010 Appropriations Act, SBIR/STTR transfer and internal below threshold reprogramming.

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FY 2010  
Decrease reflects reductions for the Section 8097 Economic Assumption, execution delays and FY 2010 new starts.  
FY 2011  
Not Applicable

**C. Accomplishments/Planned Program (\$ in Millions)**

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
<p>Vulture</p> <p>(U) The objective of the Vulture program is to develop and demonstrate the technology to enable an airborne payload to remain on-station uninterrupted for over five years performing intelligence, surveillance, and reconnaissance (ISR), and communication missions over an area of interest. Vulture technology enables a re-taskable, persistent pseudo-satellite capability, in an aircraft package. The technology combines the key benefits of an aircraft (flexibility &amp; responsiveness, sensor resolution, reduced transmit/receive power, affordability) with the benefits of space assets (on-station persistence, no logistics tail, energy independence, fleet size, absence of in-country footprint). The system has potential in numerous roles: operation as a single platform, as a formation of multiple aircraft, or as a constellation providing infrastructure augmentation or recovery. The technology challenges include developing energy management and reliability technologies capable of allowing the aircraft to operate continuously for five years. The Vulture program will conduct subscale and full-scale technology maturation and demonstration activities to prove out critical technologies. Subsequently, the program will conclude with a flight demonstration near full-scale. The anticipated transition partner is the Air Force.</p> <p><i>FY 2009 Accomplishments:</i></p> <ul style="list-style-type: none"> <li>- Initiated technology maturation efforts, specifically energy storage, non-linear aeroelastic modeling of lightly loaded structures, and extreme reliability of airborne systems.</li> <li>- Completed Phase I, including multiple conceptual designs of Objective Systems with associated subscale demonstrators, military utility analyses, and technology maturation plans.</li> </ul>	5.920	35.450	60.000	0.000	60.000

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**C. Accomplishments/Planned Program (\$ in Millions)**

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
<p><i>FY 2010 Plans:</i></p> <ul style="list-style-type: none"> <li>- Conduct initial risk reduction analyses, testing, experiments, and demonstrations.</li> <li>- Initiate demonstration of component performance and reliability including energy storage, propulsion, and flight management/control systems.</li> <li>- Conduct Systems Requirements Review.</li> <li>- Initiate preliminary design of the flight demonstrator aircraft.</li> </ul> <p><i>FY 2011 Base Plans:</i></p> <ul style="list-style-type: none"> <li>- Demonstrate component performance and reliability including energy storage, propulsion, and flight management/control systems.</li> <li>- Perform subscale vehicle fabrication and flight demonstration and initiate long lead fabrication.</li> <li>- Continue subsystem and risk reduction testing.</li> <li>- Conduct Flight Demonstrator subsystem and component Critical Design Reviews.</li> </ul>					
<p>Shrike*</p> <p>* Formerly Stealthy, Persistent, Perch and Stare (SP2S).</p> <p>(U) The goal of the Shrike program is to develop a new generation of perch-and-stare micro air vehicles based on the Wasp platform. Shrike will be capable of: 1) vertical launch, 2) forward flight to a target, 3) transition from forward flight to vertical landing at the target site, 5) secure, stable attachment to its "perch," 6) sustained perch-and-stare missions, to include data collection, and 7) re-launch from the perch and fly home. During perch-and-stare, Shrike will perform surveillance and transmit intelligence via data link to its home base. Anticipated Service users include the Army, Marines and Special Forces.</p> <p><i>FY 2009 Accomplishments:</i></p> <ul style="list-style-type: none"> <li>- Matured and integrated advanced technologies and subsystems.</li> <li>- Fabricated prototype systems.</li> </ul>	5.039	5.162	0.000	0.000	0.000

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<b>C. Accomplishments/Planned Program (\$ in Millions)</b>						
		<b>FY 2009</b>	<b>FY 2010</b>	<b>FY 2011 Base</b>	<b>FY 2011 OCO</b>	<b>FY 2011 Total</b>
<ul style="list-style-type: none"> <li>- Began initial field tests with military operators.</li> </ul> <p><i>FY 2010 Plans:</i></p> <ul style="list-style-type: none"> <li>- Refine and improve prototype designs based on field testing.</li> <li>- Develop auto-pilot for semi autonomous landing.</li> <li>- Develop attachment/perching technologies that are applicable to a wide variety of terrains.</li> <li>- Develop and demonstrate schemes for exploitation of digital communications.</li> <li>- Develop tactics, techniques and procedures for Shrike missions.</li> <li>- Conduct field tests with second generation Shrike prototypes.</li> </ul>						
<p>Triple Target Terminator (T3)</p> <p>(U) The Triple Target Terminator (T3) program will develop a high speed, long-range missile that can engage air, cruise missile, and air defense targets. T3 would be carried internally on stealth aircraft or externally on fighters, bombers and UAVs. The enabling technologies are: propulsion, multi-mode seekers, data links, digital guidance and control, and advanced warheads. T3 would allow any aircraft to rapidly switch between air-to-air and air-to-surface capabilities. T3's speed, maneuverability, and network-centric capabilities would significantly improve U.S. aircraft survivability and increase the number and variety of targets that could be destroyed on each sortie. The program will transition to the Air Force.</p> <p><i>FY 2010 Plans:</i></p> <ul style="list-style-type: none"> <li>- Conduct studies to define T3 trade space and concepts of operation.</li> <li>- Initiate preliminary design studies.</li> <li>- Conduct risk reduction experiments and modeling to validate designs.</li> </ul> <p><i>FY 2011 Base Plans:</i></p> <ul style="list-style-type: none"> <li>- Conduct preliminary design review of T3 concepts.</li> <li>- Initiate T3 critical design activities.</li> </ul>		0.000	12.146	16.908	0.000	16.908

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**C. Accomplishments/Planned Program (\$ in Millions)**

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
<p>Integrated Sensor is Structure (ISIS)</p> <p>(U) The joint DARPA/Air Force Integrated Sensor is Structure (ISIS) program is developing a sensor of unprecedented proportions that is fully integrated into a stratospheric airship that will address the nation's need for persistent wide-area surveillance, tracking, and engagement for hundreds of time-critical air and ground targets in urban and rural environments. ISIS is achieving radical sensor improvements by melding the next-generation technologies for enormous lightweight antenna apertures and high-energy density components into a highly integrated lightweight multi-purpose airship structure - completely erasing the distinction between payload and platform. The ISIS concept includes ninety-nine percent on-station 24/7/365 availability for simultaneous Airborne Moving Target Indicator (AMTI) (600 kilometers) and Ground-Based Moving Target Indicator (GMTI) (300 kilometers) operation; ten years of autonomous, unmanned flight; hundreds of wideband in-theater covert communications links; responsive reconstitution of failed space assets; plus CONUS-based sensor analysis and operation. A Memorandum of Agreement has been signed by DARPA and the Air Force to pursue the program objectives through to transition. The ISIS technology demonstration system transitions to the Air Force in 2013.</p> <p><i>FY 2010 Plans:</i></p> <ul style="list-style-type: none"> <li>- Conduct preliminary design review of demonstration system.</li> <li>- Conduct radar system operational modeling and simulation.</li> <li>- Develop and demonstrate flight dynamic controls in a lab environment.</li> <li>- Demonstrate large-scale manufacturing of prototypes and initial integration.</li> </ul> <p><i>FY 2011 Base Plans:</i></p> <ul style="list-style-type: none"> <li>- Conduct critical design review of demonstration system.</li> <li>- Conduct simulations to validate subsystem detailed designs.</li> <li>- Conduct risk reduction testing and demonstrations of integrated subsystems.</li> <li>- Manufacture airship envelope.</li> <li>- Manufacture and chamber test of dual-band RF apertures.</li> </ul>	0.000	63.400	43.400	0.000	43.400

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**C. Accomplishments/Planned Program (\$ in Millions)**

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
<p>Vulcan</p> <p>(U) The goal of the Vulcan demonstration program is to design, build, and ground test a Constant Volume Combustion (CVC) technology system that demonstrates a 20% fuel burn reduction for a ship based power generation turbine. CVC has been under development for more than a decade. Considerable progress has been made and the technology is believed mature enough to enable a dramatic new system capability. CVC, when combined with turbine engines, offers the ability to design a new class of hybrid turbine power generation engines and Mach 4+ air breathing engines. The Vulcan system will consist of a full scale CVC, a compressor, and a turbine. CVC architectures could include Pulsed Detonation Engines (PDEs), Continuous Detonation Engines (CDEs) or other unsteady CVC architectures. The CVC demonstrated in the Vulcan program would have direct application to aviation turbine engines, ship propulsion turbine engines, high mach air breathing engines, and commercial power turbine engines. In FY 2009, this program was funded in PE 0602702E, Project TT-07. Anticipated Service users include the Air Force and Navy.</p> <p><i>FY 2010 Plans:</i></p> <ul style="list-style-type: none"> <li>- Complete designs and simulations of critical components.</li> <li>- Conduct risk reduction demonstrations of the combustor rig, fuel system, valve rig, initiator, seals, and thermal management system rig components.</li> <li>- Complete CVC engine preliminary design review.</li> <li>- Initiate detailed design of subsystems.</li> </ul> <p><i>FY 2011 Base Plans:</i></p> <ul style="list-style-type: none"> <li>- Conduct simulations to validate subsystem detailed designs.</li> <li>- Conduct risk reduction testing and demonstrations of integrated subsystems including the CVC engine, inlet, and nozzle.</li> <li>- Begin CVC engine compressor and turbine fabrication.</li> </ul>	0.000	35.000	45.000	0.000	45.000
Long Range Anti-Ship Missile Demonstration (LRASM)	0.000	54.950	67.560	0.000	67.560

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**C. Accomplishments/Planned Program (\$ in Millions)**

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
<p>(U) In response to emerging threats, DARPA is building on recent technology advances to develop and demonstrate standoff anti-ship strike technologies to reverse the significant and growing U.S. naval surface strike capability deficit. The Long Range Anti-Ship Missile (LRASM) program (previously funded in PE 0602702E, Project TT-03, Naval Warfare Technology) will invest in advanced component and integrated system technologies capable of providing a dramatic leap ahead in U.S. surface warfare capability focusing on organic wide area target discrimination in a network denied environment, innovative terminal survivability in the face of advanced defensive systems, and high assurance target lethality approaches. Specific technology development areas will include: robust precision guidance, navigation and control with GPS denial, multi-modal sensors for high probability target identification in dense shipping environments, and precision aimpoint targeting for maximum lethality. Component technologies will be developed, demonstrated, and integrated into a complete weapon system. The program will result in a high fidelity demonstration to support military utility assessment. A joint DARPA/ Navy effort, Navy is providing the 50% of necessary funds and is the transition partner.</p> <p><i>FY 2010 Plans:</i></p> <ul style="list-style-type: none"> <li>- Continue risk reduction testing of critical components, including seeker data collection, wind tunnel tests, and propulsion direct-connect tests.</li> <li>- Complete integrated system preliminary designs and hold Preliminary Design Reviews.</li> <li>- Conduct high fidelity independent government performance assessment of preliminary designs against key performance criteria.</li> <li>- Generate supporting documentation including flight test and safety plans, system engineering master plans, test and evaluation master plans, lifecycle cost estimates, and transition plans.</li> <li>- Commence subsystem detail designs and developmental testing.</li> <li>- Initiate long-lead procurements.</li> </ul> <p><i>FY 2011 Base Plans:</i></p> <ul style="list-style-type: none"> <li>- Complete subsystem detail designs and developmental testing; including seeker captive carry tests, wind tunnel tests, and propulsion free-jet test.</li> </ul>					

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**C. Accomplishments/Planned Program (\$ in Millions)**

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
<ul style="list-style-type: none"> <li>- Develop hardware in the loop platforms and conduct integrated system developmental tests.</li> <li>- Complete integrated system detail designs and hold Critical Design Reviews.</li> <li>- Conduct high fidelity independent government performance assessment of final designs against key performance criteria.</li> <li>- Update supporting documentation including flight test and safety plans, system engineering master plans, test and evaluation master plans, lifecycle cost estimates, and transition plans.</li> <li>- Commence system fabrication of flight test vehicles for initial incremental test events.</li> </ul>					
<p>DiscRotor Compound Helicopter</p> <p>(U) The goal of the DiscRotor Compound Helicopter program is to design and demonstrate the enabling technologies required to develop a new type of compound helicopter capable of high-efficiency hover, high-speed flight, and seamless transition between these flight states. The aircraft will be equipped with an aft-swept wing as well as a mid-fuselage disc with extendable rotor blades, enabling the aircraft to take-off and land like a helicopter. Transition from helicopter flight to full fixed-wing flight is achieved by fully retracting the blades within the disc. An aircraft capable of long range high speed (300-400 kts) and vertical take-off and landing (VTOL)/hover will satisfy an ongoing military interest, bridging the gap in helicopter escort and insertion missions by providing survivability, mobility, and responsiveness for troop and cargo insertion. The DiscRotor enabling technologies are: variable thrust ducted prop-fans, extending telescopic rotor blades, counter torque control, and an integrated propulsion system. A prime technical objective of the DiscRotor concept is to achieve seamless reversible transition between hover and wing borne flight states. Specific objectives of the DiscRotor Compound Helicopter program include: demonstrating the feasibility of retracting the extendable blades into the disc, characterizing the flowfield environment created by a disc-rotor, demonstrating disc-rotor enabling technologies, and designing and wind tunnel testing a retractable rotor demonstrator. The anticipated transition partner is the Air Force.</p> <p><i>FY 2009 Accomplishments:</i></p> <ul style="list-style-type: none"> <li>- Completed small scale rotor (non-retractable) design and initiated fabrication.</li> </ul>	5.342	7.940	2.210	0.000	2.210

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**C. Accomplishments/Planned Program (\$ in Millions)**

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
<ul style="list-style-type: none"> <li>- Conducted analysis and refinement of the vehicle conceptual approach and configurations.</li> <li>- Performed computational fluid dynamics analyses and predictions.</li> </ul> <p><i>FY 2010 Plans:</i></p> <ul style="list-style-type: none"> <li>- Begin to develop and fabricate 12 foot diameter large-scale extendable/retractable rotor model.</li> <li>- Conduct wind tunnel testing of small-scale air vehicle and static testing of small scale (non-retractable) rotor model.</li> <li>- Continue analysis and refinement of operational air vehicle configuration.</li> <li>- Continue refinement of computational fluid dynamics analyses and predictions.</li> </ul> <p><i>FY 2011 Base Plans:</i></p> <ul style="list-style-type: none"> <li>- Continue refinement of operational air vehicle configuration.</li> <li>- Test extensions and retractions of the large-scale rotor model in a wind-tunnel under simulated conversion conditions.</li> <li>- Validate DiscRotor conceptual approach, risk assessment, and definition of demonstrator requirements.</li> </ul>					
<p>Mode Transition (MoTr) Demonstration</p> <p>(U) The Mode Transition (MoTr) Demonstration program seeks to ground test a turbine-based combined-cycle (TBCC) engine using hydrocarbon fuel. The MoTr program will demonstrate transition from turbojet to ramjet/scramjet cycle and is the critical experiment required to enable reusable, air-breathing, hypersonic flight. MoTr leverages previous and on-going advances in air-breathing propulsion technology, including the Falcon Combined-cycle Engine Technology (FaCET) and the Air Force/DARPA High Speed Turbine Engine Technology Demonstration (HiSTED) program. In FY 2009, this program was funded in PE 06032867E, Project SPC-01, Space Programs and Technologies. The anticipated transition partner is the Air Force.</p>	0.000	13.730	35.000	0.000	35.000

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**C. Accomplishments/Planned Program (\$ in Millions)**

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
<p><i>FY 2010 Plans:</i></p> <ul style="list-style-type: none"> <li>- Complete critical design of a TBCC engine model.</li> <li>- Complete critical design of primary testing modifications.</li> <li>- Initiate demonstration hardware fabrication.</li> <li>- Complete primary test rig modifications and checkouts.</li> </ul> <p><i>FY 2011 Base Plans:</i></p> <ul style="list-style-type: none"> <li>- Complete demonstration hardware fabrication.</li> <li>- Integrate demonstration hardware and test facility.</li> <li>- Execute ground test.</li> <li>- Validate and document test results.</li> </ul>					
<p><b>Persistent Close Air Support (PCAS)</b></p> <p>(U) The Persistent Close Air Support (PCAS) program will significantly increase close air support (CAS) capabilities by developing a system to allow continuous CAS availability and lethality to the supported ground commander. The enabling technologies are: manned/unmanned attack platforms, next generation graphical user interfaces (GUI), data links, digital guidance and control, and advanced munitions. PCAS will be a 'system-of-systems' approach demonstrating the ability to digitally task a CAS platform from the ground to attack multiple/simultaneous targets. PCAS will allow the Joint Tactical Air Controller (JTAC) the ability to rapidly engage multiple, moving, and simultaneous targets within his area of responsibility. PCAS's ability to digitally task a CAS platform to attack multiple/simultaneous targets would clearly improve U.S. ground forces operations and speed of attack. The system will be designed to reduce collateral damage and potential fratricide to friendly forces. The anticipated transition partner is the Air Force.</p> <p><i>FY 2010 Plans:</i></p> <ul style="list-style-type: none"> <li>- Conduct studies to define PCAS trade space and concepts of operation.</li> </ul>	0.000	9.000	9.000	0.000	9.000

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**C. Accomplishments/Planned Program (\$ in Millions)**

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
<p><i>FY 2011 Base Plans:</i></p> <ul style="list-style-type: none"> <li>- Initiate preliminary design studies.</li> <li>- Conduct system risk reduction experiments and modeling to validate approaches of control for PCAS targeting and coordination of fires.</li> </ul>					
<p>Advanced Aerospace System Concepts</p> <p>(U) Studies conducted under this program examine and evaluate emerging aerospace technologies and system concepts for applicability to military use. This includes the degree and scope of potential impact/improvements to military operations, mission utility, and warfighter capability. Studies are also conducted to analyze emerging aerospace threats along with possible methods and technologies to counter them. The feasibility of achieving potential improvements, in terms of resources, schedule, and technological risk, is also evaluated. The results from these studies are used, in part, to formulate future programs or refocus ongoing work. Topics of consideration include: methods of defeating enemy anti-aircraft attacks; munition technologies to increase precision, range, endurance, and lethality of weapons for a variety of mission sets; novel launch systems; air vehicle control, power, propulsion, materials, and architectures; and payload and cargo handling systems.</p> <p><i>FY 2009 Accomplishments:</i></p> <ul style="list-style-type: none"> <li>- Performed studies of candidate technologies and developed system concepts.</li> <li>- Conducted modeling and simulation of system architectures and scenarios.</li> <li>- Developed, analyzed, and assessed initial munition concepts that would allow aircraft to rapidly switch between air-to-air and air-to-surface capabilities.</li> </ul> <p><i>FY 2010 Plans:</i></p> <ul style="list-style-type: none"> <li>- Analyze materials, designs and techniques for air systems weight reduction and structural efficiency, including complex fittings associated with propulsion and drive system housings and gearbox cases.</li> <li>- Conduct enabling technology and sub-system feasibility experiments.</li> </ul>	2.297	2.500	2.000	0.000	2.000

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<b>C. Accomplishments/Planned Program (\$ in Millions)</b>						
		<b>FY 2009</b>	<b>FY 2010</b>	<b>FY 2011 Base</b>	<b>FY 2011 OCO</b>	<b>FY 2011 Total</b>
<i>FY 2011 Base Plans:</i> - Conduct proof-of-concept demonstrations to verify technologies developed.						
<b>Autonomous Aerial Refueling</b>  (U) The Autonomous Aerial Refueling (AAR) program will demonstrate high altitude refueling between unmanned aircraft in an operational environment. The program will leverage existing RQ-4 Global Hawk unmanned aircraft systems equipped with probe and drogue style refueling hardware and an autonomous refueling system. Specific challenges include achieving a repeatable probability of success with limited flight performance aircraft under high altitude conditions, redundant safe separation and unmanned flight operations. AAR will allow developers of high altitude long endurance aircraft to confidently employ the advantages of air refueling that have proven so vital to manned aviation. The program will foster the application of autonomy for better effectiveness, efficiency and safety in challenging battlespaces and also offers the potential for direct transition to the Global Hawk fleet.  <i>FY 2010 Plans:</i> - Perform initial requirements allocation and system design. - Conduct modeling and simulation of high-altitude refueling.  <i>FY 2011 Base Plans:</i> - Validate drogue performance at altitude (single-ship). - Accomplish aircraft modifications. - Complete flight test and achieve repeatable refueling performance. - Conduct operationally stressing refueling demonstration (e.g., one-week flight demo).		0.000	17.000	17.000	0.000	17.000
<b>ArcLight</b>  (U) The ArcLight program will design, build, and flight test a long range (>2,000 nm) vehicle that carries a 100-200 lb payload(s). ArcLight is based on an SM-3 Block II booster stack, a hypersonic glider and		0.000	2.000	5.000	0.000	5.000

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2011 Defense Advanced Research Projects Agency				<b>DATE:</b> February 2010		
<b>APPROPRIATION/BUDGET ACTIVITY</b> 0400: <i>Research, Development, Test &amp; Evaluation, Defense-Wide</i> BA 3: <i>Advanced Technology Development (ATD)</i>		<b>R-1 ITEM NOMENCLATURE</b> PE 0603286E: <i>ADVANCED AEROSPACE SYSTEMS</i>				
<b>C. Accomplishments/Planned Program (\$ in Millions)</b>						
		<b>FY 2009</b>	<b>FY 2010</b>	<b>FY 2011 Base</b>	<b>FY 2011 OCO</b>	<b>FY 2011 Total</b>
<p>is capable of being launched from a Mark 41 Vertical Launch System (VLS) tube. The development of the ArcLight system will enable high speed, long range weapons capable of engaging time critical targets and can be launched from Naval surface and sub-surface assets, and Naval/Air Force air assets. Transition partners include the Navy and Air Force.</p> <p><i>FY 2010 Plans:</i></p> <ul style="list-style-type: none"> <li>- Conduct feasibility testing of novel material technology.</li> </ul> <p><i>FY 2011 Base Plans:</i></p> <ul style="list-style-type: none"> <li>- Initiate risk reduction development and test of key ArcLight enabling technologies.</li> <li>- Begin systems concept development.</li> </ul>						
<p><b>Heliplane</b></p> <p>(U) The Heliplane program evaluated key enabling technologies for an air vehicle that combines the vertical take-off and landing (VTOL) and low disk loading characteristics of a helicopter with the speed and efficiency characteristics of a fixed wing aircraft. Specifically, the program sought to provide a 400 mph cruise speed, a 1,000 lb payload, and an unrefueled range of 1,000 miles capability for Combat Search and Rescue (CSAR) missions.</p> <p><i>FY 2009 Accomplishments:</i></p> <ul style="list-style-type: none"> <li>- Completed the preliminary design of an alternate rotor configuration.</li> <li>- Completed the design of the rotor and controls.</li> <li>- Initiated the design of a scale model of the Heliplane and of a tip-jet nozzle.</li> </ul>		5.384	0.000	0.000	0.000	0.000
<p><b>Rapid Eye</b></p> <p>(U) The goal of the Rapid Eye program was to develop a high altitude, long endurance unmanned aircraft that could be rocket-deployed world-wide from the continental United States within 1-2 hours to perform intelligence, surveillance, reconnaissance (ISR), and communication missions. The program</p>		14.270	0.000	0.000	0.000	0.000

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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2011 Defense Advanced Research Projects Agency **DATE:** February 2010

<b>APPROPRIATION/BUDGET ACTIVITY</b> 0400: <i>Research, Development, Test &amp; Evaluation, Defense-Wide</i> BA 3: <i>Advanced Technology Development (ATD)</i>	<b>R-1 ITEM NOMENCLATURE</b> PE 0603286E: <i>ADVANCED AEROSPACE SYSTEMS</i>
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<b>C. Accomplishments/Planned Program (\$ in Millions)</b>	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
examined enabling technologies such as inflatable/folding structures, lightweight reentry systems, and high-altitude propulsion.  <i>FY 2009 Accomplishments:</i> <ul style="list-style-type: none"> <li>- Developed Rapid Eye risk management, technology development, and system maturation plan.</li> <li>- Completed system conceptual design and system requirements review.</li> </ul>					
<b>Accomplishments/Planned Programs Subtotals</b>	38.252	258.278	303.078	0.000	303.078

**D. Other Program Funding Summary (\$ in Millions)**

N/A

**E. Acquisition Strategy**

N/A

**F. Performance Metrics**

Specific programmatic performance metrics are listed above in the program accomplishments and plans section.

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