Exhibit R-2, RDT&E Budget Item Justification							Date: February 2003	
Appropriation/Budget Activity RDT&E,D BA4				R-1 Item Nomenclature: **0604618D8Z, Man Portable Air Defense Systems (MANPADS)**				
Cost ($ in millions)	FY 2002	FY 2003	FY 2004	FY2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	0	0	25.000	21.609	13.712	.971	.979	.978
MANPAD	0	0	25.000	21.609	13.712	.971	.979	.978

A. Mission Description and Budget Item Justification:

(U) Man Portable Air Defense (MANPAD) systems are very widely proliferated, with greater than 500,000 produced and many poorly controlled. These weapons can be easily concealed and transported in a container as small as a suitcase, and can be lethal to a wide range of military and dual use aircraft. MANPAD systems and their launchers are available on the black market for as little as $15,000. Department of Defense (DOD) and Civil Reserve Air Fleet (CRAF) aircraft are attractive terrorist targets, and are very vulnerable to MANPAD attack. Due to the limited effective range of MANPADS, any attack would probably occur in the close vicinity of an airfield, possibly outside any protected perimeter.

(U) Current systems to counter the MANPAD threat carry all components in the protected aircraft, and cost between $250,000 and $5,000,000 per aircraft installation. Integration of these systems (especially their advanced launch detection sensors) is complex, time consuming and expensive.

(U) The process of defeating a MANPAD missile includes two necessary tasks, detecting missile launch, and deploying countermeasures to defeat the missile guidance system. Current approaches rely either on visual detection (unreliable) or on expensive aircraft sensors mounted on the protected aircraft. Countermeasures consist of either infrared decoys (usually pyrotechnic flares) or directed energy systems such as lasers. Reliable missile launch detection is a technological challenge, and drives both the cost and effectiveness of countermeasures systems

(U) Two new techniques are being considered to reduce the cost and lead time required to protect aircraft from a MANPAD. The first is the development of an innovative ground based, networked electro-optical sensor grid that would provide missile launch detection and data link this information to protected aircraft. The second is the development of new countermeasures technologies based upon special materials which will be safer to use and more acceptable for use in urban and expeditionary airfields than pyrotechnic flares.

(U) The ground based sensor grid consists of an array of sensors that constantly monitor for the presence of a MANPAD launch. Several factors favor this architecture, with much higher detection and lower false alarm rates than current on-aircraft launch detectors. First, the sensors will be looking up at the uncluttered sky as a background versus aircraft based sensors that look down at the ground that's cluttered and full of sources of false alarms. Second, the system will rely on the detection of a launch by two overlapping sensors before a launch is declared. The sensor grid will use commercially available components to reduce cost and the lead-time to field a system. Additionally, it will be possible make the system portable by mounting the sensors on vehicles and using wireless networking between the sensors. Expeditionary airfields could be quickly protected. The key element of this approach is that the missile threat will be declared by the off board sensor grid, and then the aircraft under attack would be notified via data link to dispense countermeasures (without humans in the loop due to meet the required response time).

(U) The most commonly used MANPAD countermeasure today is a pyrotechnic flare that is ejected from a dispenser on the protected aircraft. While these countermeasures are effective and relatively cheap, frequent use in heavily populated areas, or from aircraft such as transport/CRAF aircraft, would be difficult to explain and introduce to the public.

B. **Program Change Summary:** (Show total funding, schedule, and technical changes for the program element that have occurred since the previous President's Budget Submission)

	FY 2002	FY 2003	FY 2004	FY 2005
Previous President's Budget	0	0	0	0
Current FY2004 President's Budget	0	0	25.000	21.609
Total Adjustments				
Congressional program reductions				
Congressional rescissions				
Congressional increases				
Reprogrammings				
SBIR/STTR Transfer				
Other			+25.000	+21.609